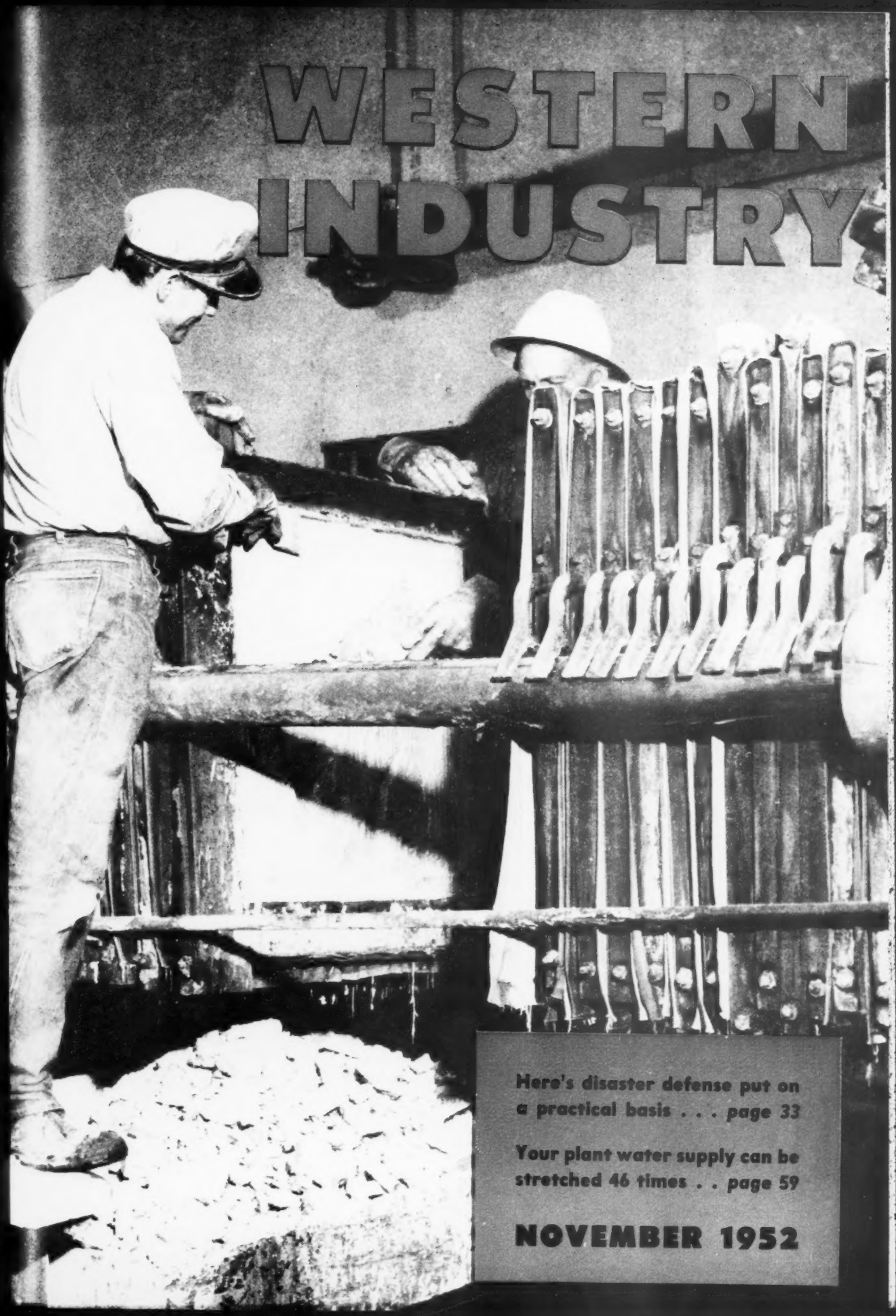
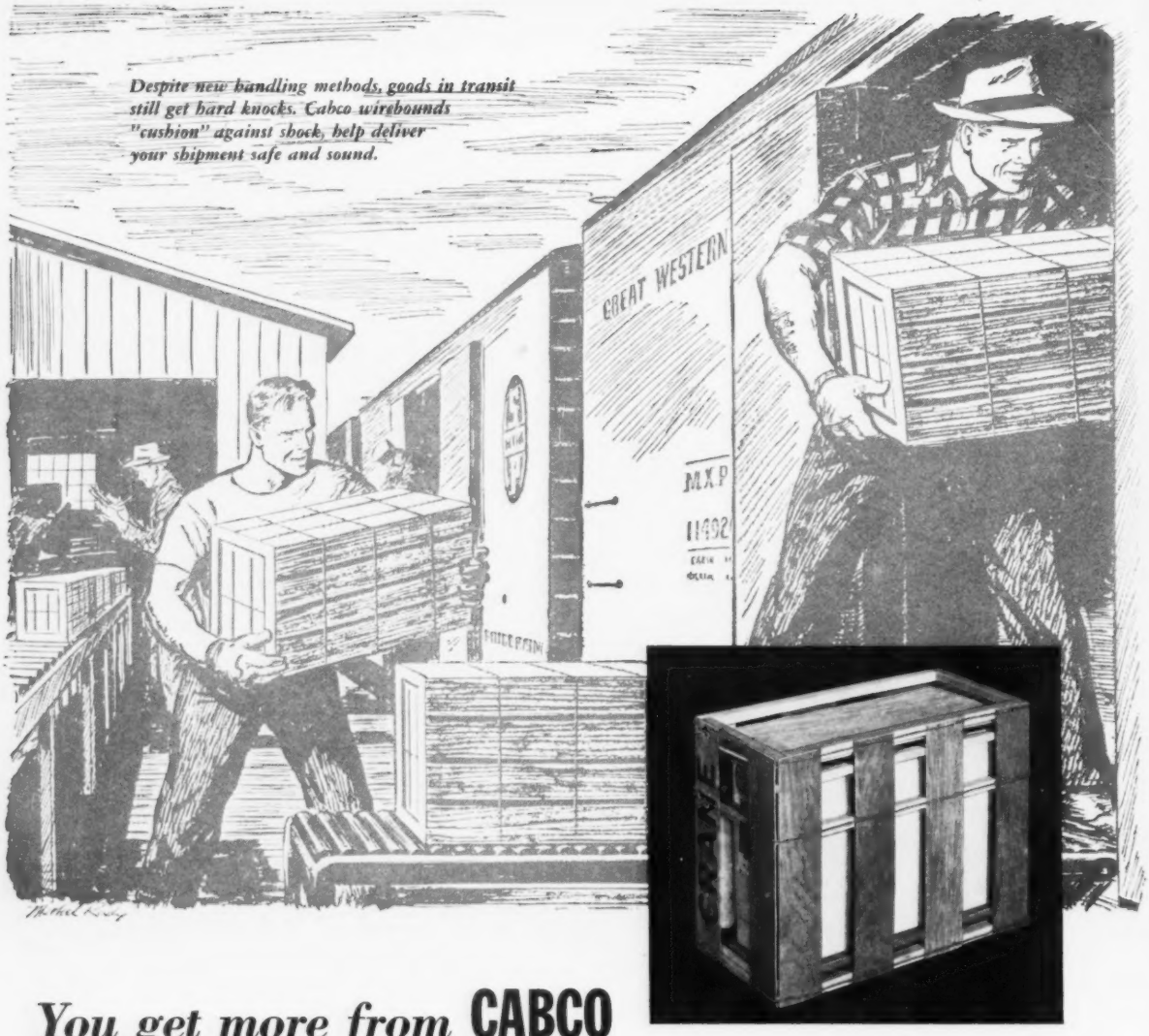
# WESTERN INDUSTRY



Here's disaster defense put on a practical basis . . . *page 33*

Your plant water supply can be stretched 46 times . . *page 59*

**NOVEMBER 1952**


Despite new handling methods, goods in transit still get hard knocks. Cabco wirebounds "cushion" against shock, help deliver your shipment safe and sound.
GREAT WESTERN
MXP
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"Give" and "take" are essential ingredients of Cabco containers. There's more "give"—more *resiliency*—to absorb shocks, protect produce and manufactured goods. And there's more "take" where punishment is concerned. All because Cabco has made a lifetime study of wooden shipping containers—because we control every manufacturing step from our timberstands to the finished container. Add to this streamlined "one-company" production system the design experience of Cabco engineers, and it's easy to see why you get *more* from Cabco!

**LEADING PLUMBING MANUFACTURERS** ship tanks, bowls, lavatories—even tubs and heavy shower bases in wooden wirebounds. Wirebound containers are light weight, yet offer superior protection, cushion travel shocks because of inherent "flex" action, sturdy construction. They permit high stacking in warehouse, and palletize or handle easily with lift or hand truck. Open construction permits quick identification of contents.

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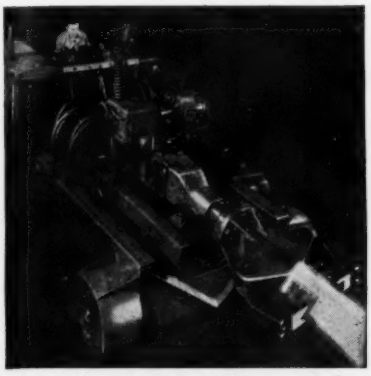
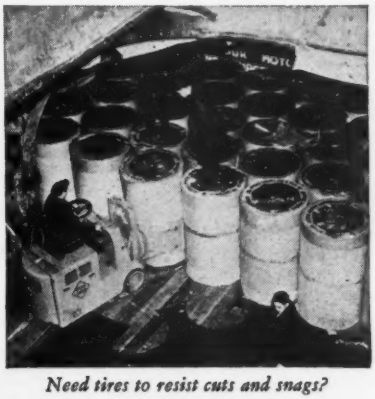


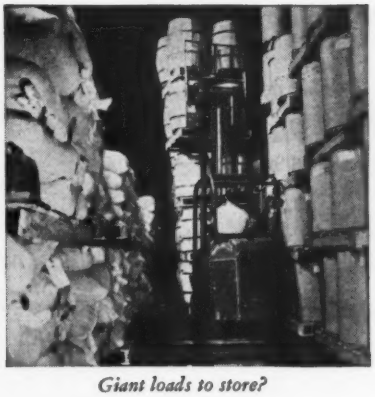
*Unusual equipment? Cumbersome loads?*



*Need tires to resist cuts and snags?*

*Tire-damaging hauling surfaces?*

*Which tread compound for greasy floors?*



*Giant loads to store?*

*Which tread design gives longest wear?*

## How to save up to 50% on industrial tires and wheels

● Materials handling costs going up? Then perhaps you should be using different types of industrial tires and wheels. Right tires wear longer, decrease maintenance costs, reduce repair time. It takes expert advice to pick the right tire for the job — advice you can get *free* from the B. F. Goodrich Tire & Wheel Analysis Plan. A trained BFG man studies your equipment, loads, hauling surfaces and any special problems. He makes impartial recommendations as to the right tread compound and design, type and size tire for your job. He gives maintenance tips, too.

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# WESTERN INDUSTRY

VOLUME XVII NOVEMBER • 1952 NUMBER 11

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## FRONT COVER

Colorado Plateau area—where Colorado, Utah, Arizona and New Mexico meet, is becoming an important producing area for uranium-vanadium ore deposits. "Yellow cake," as they call uranium extracted from the ore in this Uravan mill, is here being scraped off filter presses ready to be dried and packed for delivery to AEC.

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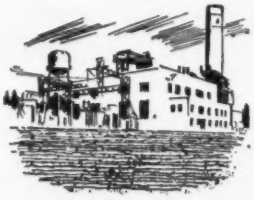

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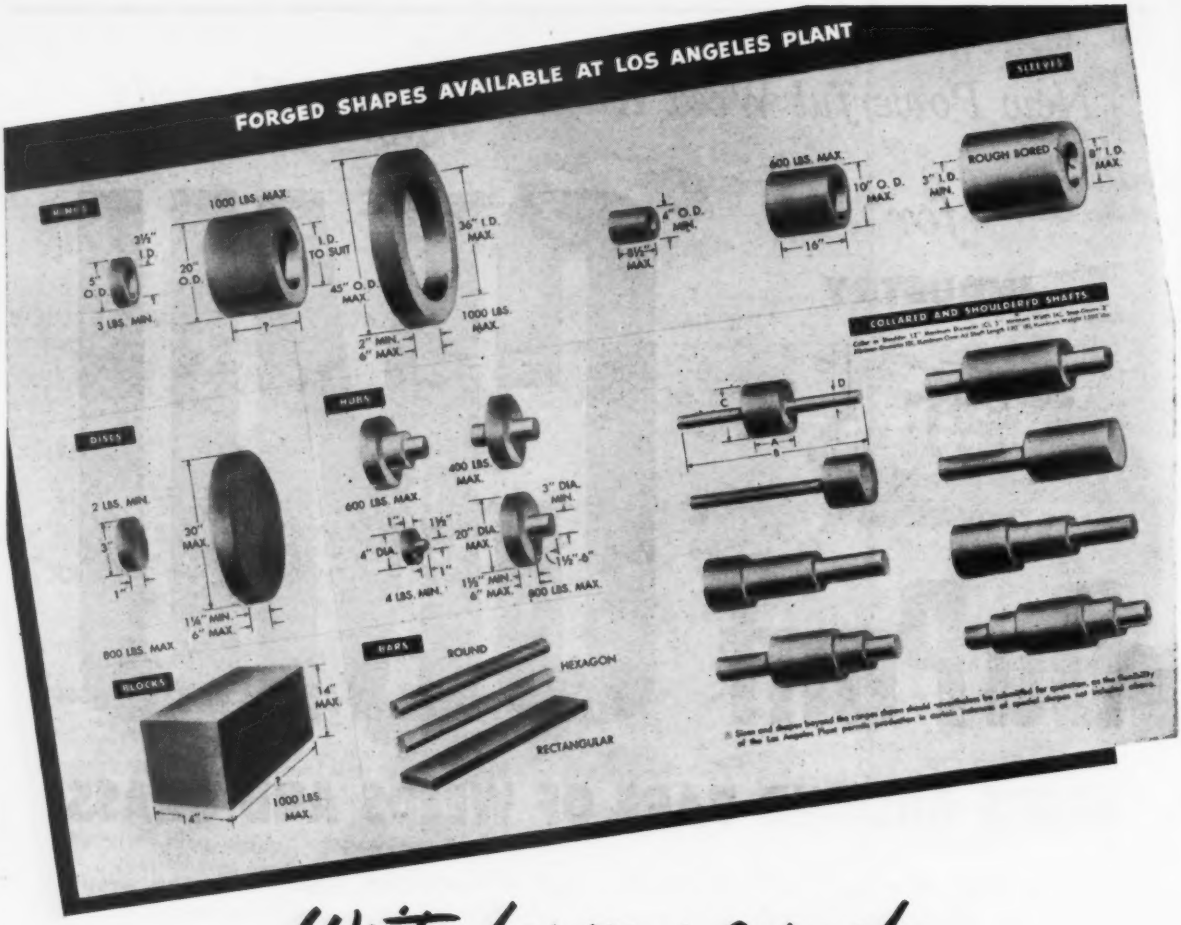


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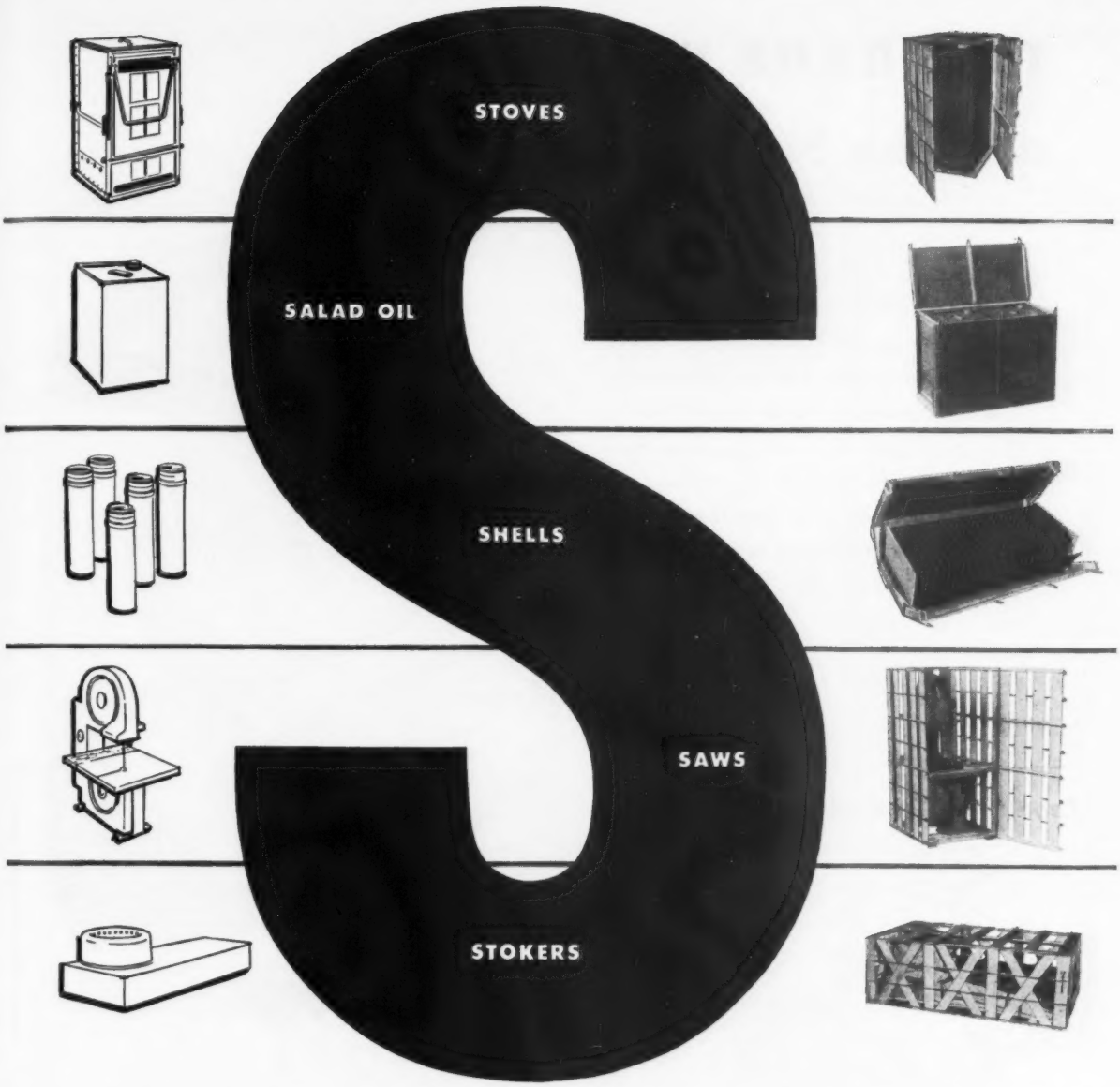


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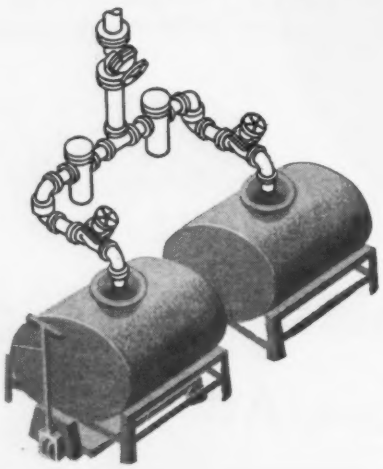
***Read these Facts of the Case!***



***Where Installed:*** In a paint factory making rubber base coatings, on liquid latex supply lines.

***Trouble Encountered:*** Valves formerly used were conventional design with working parts exposed to fluid. The sticky latex accumulated and congealed in the bonnet and stem threads. Valve operation was difficult or impossible, forcing frequent clean-outs, costly production delays.

***Solution and Result:*** Crane Diaphragm Valves completely stopped the trouble. Their sealed-from-fluid bonnet keeps latex out of the working parts. They operate smoothly; never stick. Adopted as standard equipment on this plant's latex lines.

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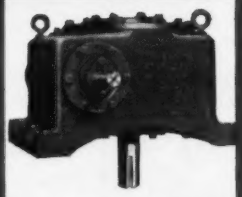
Herringbone Reducer



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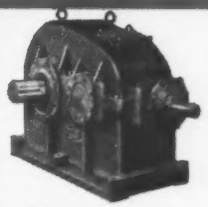
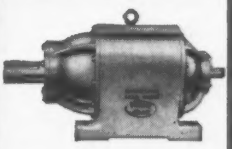
We design and manufacture *"every type and size"* of Gear and Speed Reducer . . . This fact is *important* because: (1) It assures the purchaser of our "unbiased" recommendations; (2) Permits ordering from "one source" of supply; (3) Enables the purchaser to place the *responsibility* for the operation of their Gears and Speed Reducers upon the shoulders of "one manufacturer."

Your inquiries are invited for information on any type of Gear or Gear Driven Product which includes the widely used *"Limitorque" Motor-Operated Valve Control.*

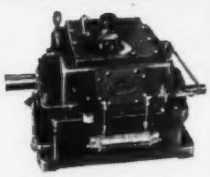
Send for catalog on any product.



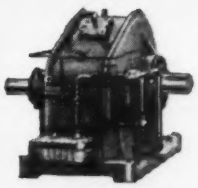
Spiral-Bevel Reducer



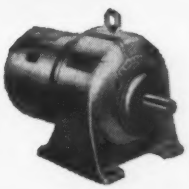
Planetary Reducer



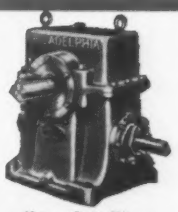
Change Speed Unit



Speed Increaser



Gearmotor



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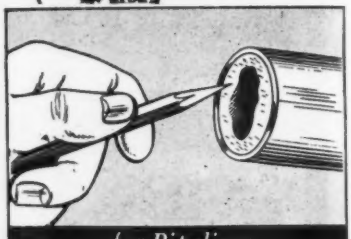

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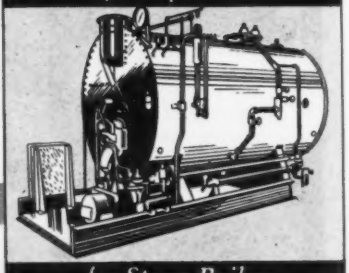
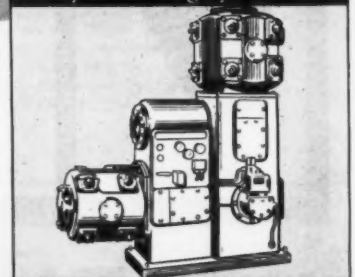


*for Steam Boilers*

*for Cooling Systems*



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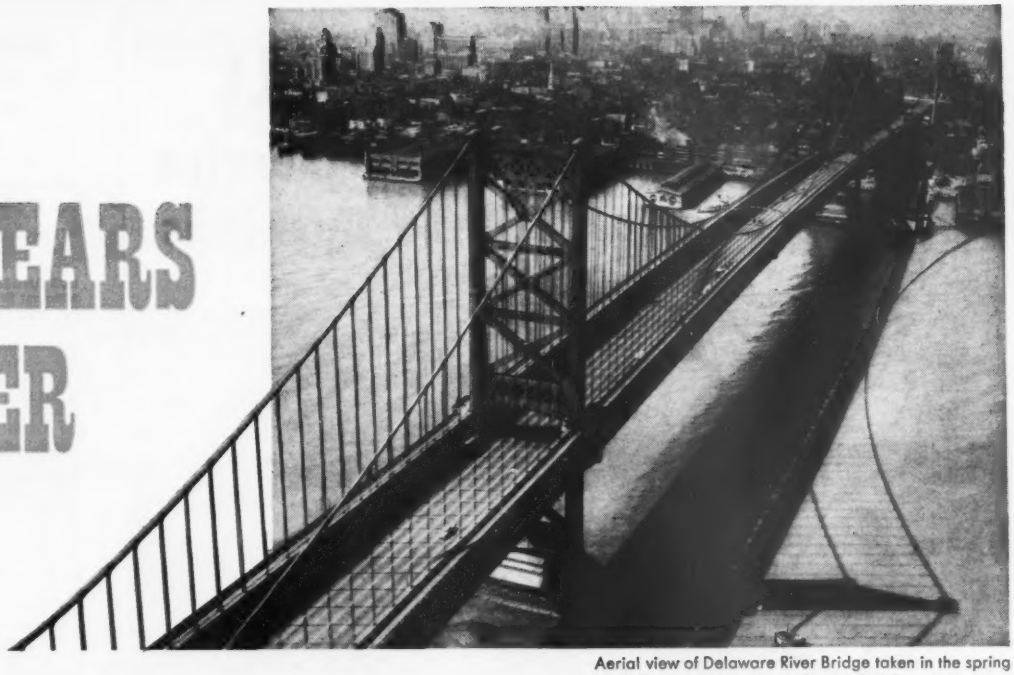
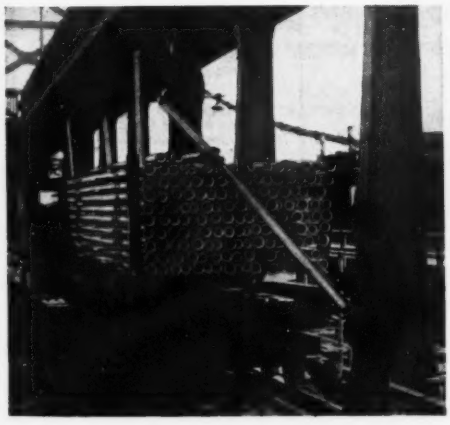
# 15 YEARS LATER



Aerial view of Delaware River Bridge taken in the spring of 1952, showing the High Speed Rail Transit Lines on outer sides of bridge. Photo by Aero Service Corporation.

## ...a report on the service of Everdur Electrical Conduit on the Delaware River Bridge



In 1936, at the time of installation, the Transit Line rails were utilized to transport 20-foot lengths of Everdur Conduit to the cable runways.

The Delaware River Bridge, linking Camden, N. J. with Philadelphia, opened to vehicular traffic in July 1926. In 1934-36, when the High Speed Rail Transit Line was installed, more than 200,000 pounds, or 14½ miles of Everdur* Conduit, in nominal sizes from 1½" to 4", was used for electrification and electro-pneumatic signal operations.

Service conditions were anything but good—and the problems encountered included corrosive industrial gases and almost continual vibration caused by the rapid transit rail cars and 70,000 motor vehicles a day.

Now, with another bridge expansion project planned, an engineer of The American Brass Company made an "on-location" inspection of the 15-year-old installation. The detailed report concludes as follows:

> *"It is my opinion that the corrosion rate of the unpainted Everdur Conduit installed on the Delaware River Bridge is very low, and that the conduit will last as long as the bridge itself."*

Everdur Electrical Conduit is made of Everdur Copper-Silicon Alloy in two wall thicknesses (R.C. and E.M.T.). Publication E-12 describes this ANACONDA Product in detail. For a copy, address The American Brass Company, General Offices, Waterbury 20, Connecticut. 53165

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***a product of***

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*Dependable*

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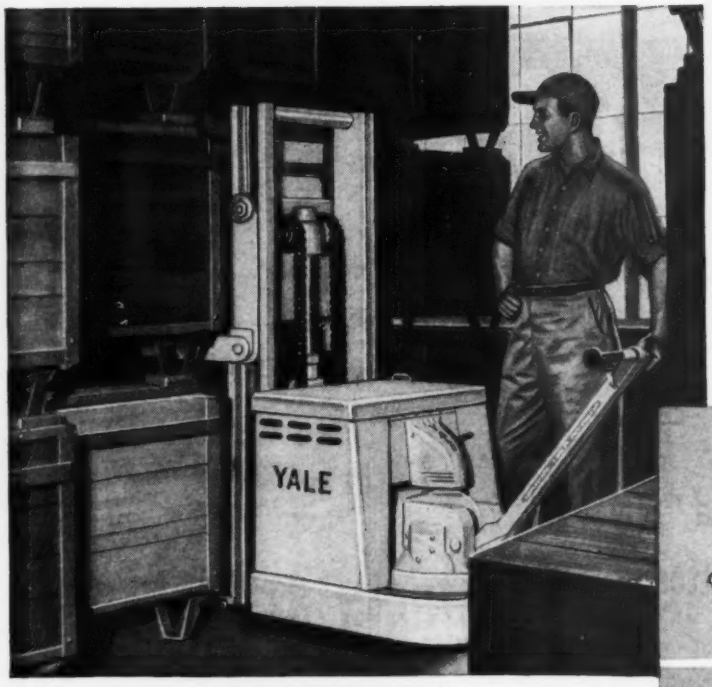


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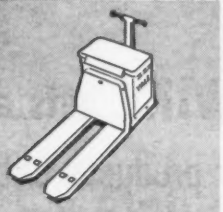

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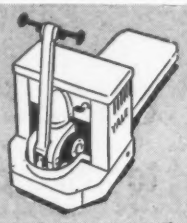

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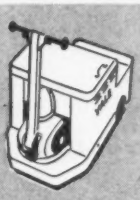

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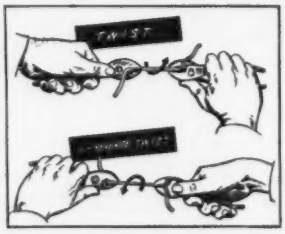
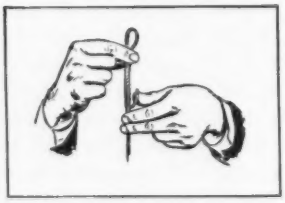


**TEST NO. 1.** Chase wire is twisted ten times in each direction to reveal seams, slivers, as well as other irregularities.



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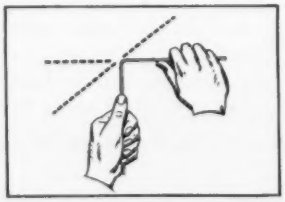

**TEST NO. 3.** Chase wire is bent sharply at right angles in four different directions to reveal possible brittle condition.

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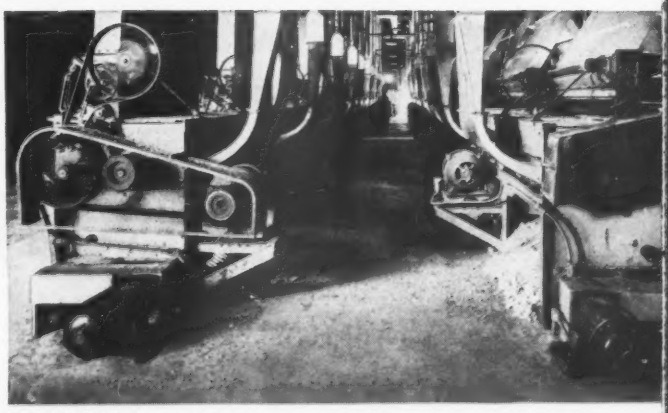

**PRODUCER'S COTTON OIL CO.** is a G-E Pacific Gear-motor user. Gear-motors shown above operate low-speed drive equipment.

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# STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol O.H.T. Grease

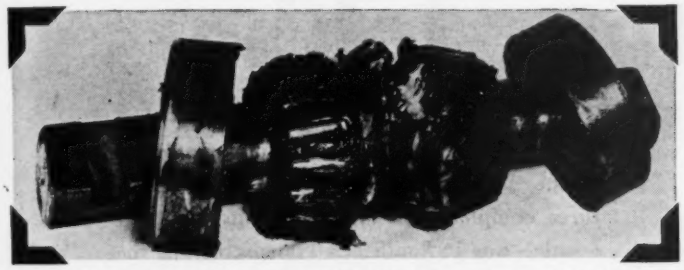
UNIT Sealed tractor rollers — 5.344-inch roller bearings

LUBRICATOR 1¼ lbs. grease, sealed in

CONDITIONS On bulldozer — rock excavation

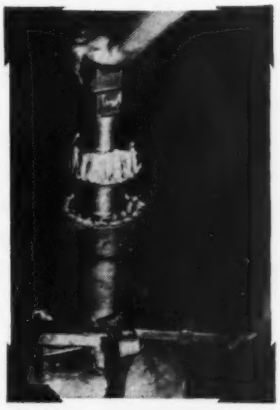
FIRM D & M Machine Works, Torrance, Calif.

# Track-roller bearings work year without greasing!



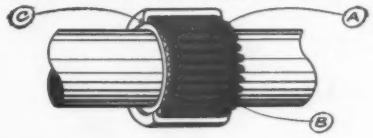
THESE TWO 5.344-INCH TIMKEN BEARINGS, part of a D & M Machine Works sealed assembly (right) taken from a track-layer bulldozer, showed only 0.0025 inch wear on each despite more than a year of rugged operation on highway construction work in the Arizona desert. The job was so tough that some roller shafts were bent; when project was completed, dozer was "walked" 30 miles on rough road. Yet, lubricated with Calol O.H.T. Grease, unit required no field servicing. When opened, it contained no grit, dust, or deposits—even color of grease was the same except for surface discoloration due to a dye used in the black neoprene seals.

CALOL O.H.T. GREASE is used by the D & M Machine Works, Torrance, Calif., for lubrication of all assemblies. Bearings are squeezed full and grease is later put in the shaft housing—a total of 1¼ lbs. in each unit.



REMARKS: Calol O.H.T. Grease has solved unusual lubrication problems in many lines of industry. It is recommended for all types of plain and antifriction bearings in extremely severe service.

## How Calol O.H.T. Grease protects bearings in severest operating conditions




Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10°F. to 400°F., Calol O.H.T. Grease will last indefinitely.

A. Contains special oxidation inhibitor—helps prevent rusting, corrosion, hardening of grease at any time.

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Bethlehem Pacific holds a unique position in the Western fastener market. It operates three complete bolt and nut plants—one in Seattle—one in South San Francisco—one in Los Angeles. Each of these plants manufactures a full line of standard fasteners in addition to special fastener items.

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There are no better steel fasteners on the market today than those manufactured by Bethlehem Pacific. Made on modern automatic machines, they are uniform, true to size, clean and thoroughly dependable.

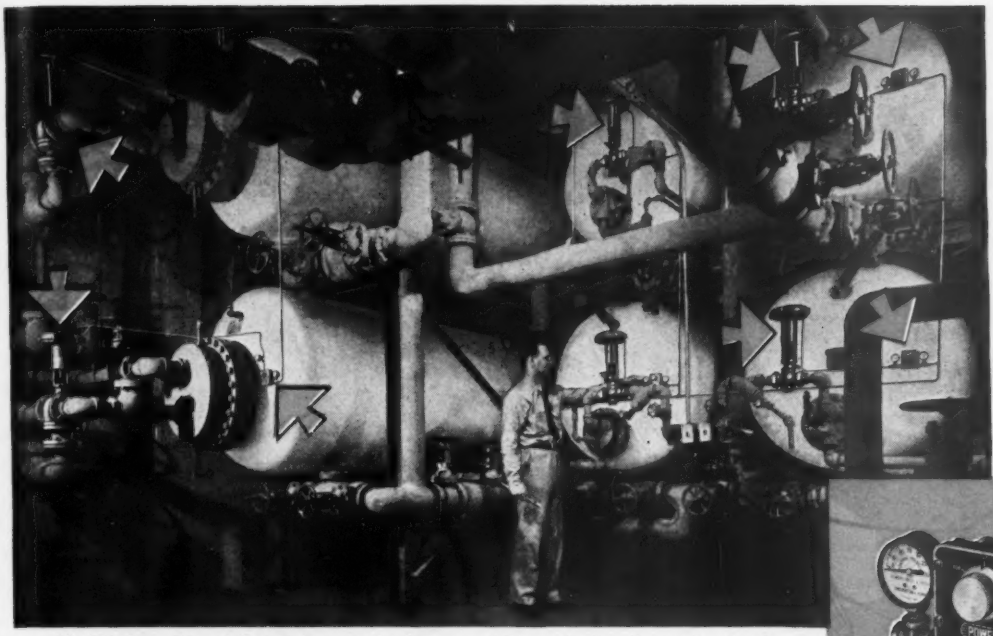
Call any of our sales offices for full information on Bethlehem Pacific fasteners.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

*Sales Offices:* San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM STEEL

**BETHLEHEM PACIFIC**



**WATER HEATERS AT LEVER HOUSE New York City**

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Consulting Engineers: Jaros, Baum & Bolles

Contractor: Gillman-Rous-Pesce Corp.

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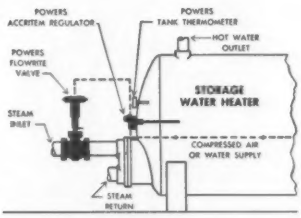


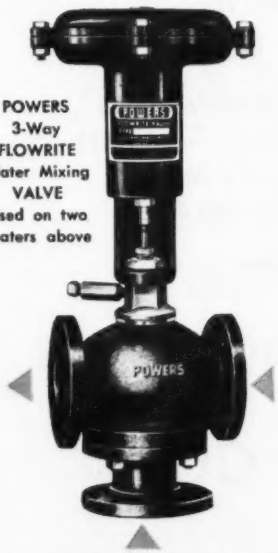


POWERS 3-Way FLOWRITE Water Mixing VALVE Used on two heaters above

## *Important Features that Give Better Control and Lower Maintenance*

- ***Adjustable Sensitivity*** and over-heat protection.
- ***Calibrated Dial*** temperature adjustment.
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- ***Easy to Install.*** Requires 15 lb. supply of compressed air or water for its operation.
- ***Small Size***—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long with ½" I. P. S. connection.

Bulletin 316 gives full details

***Call Powers*** for aid with your problems of temperature control. Our more than 60 years of experience may be helpful to you. Whether you want a simple self-operated regulator or thermostatic water mixing valve or a pneumatic control system with recording controllers...contact Powers.

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*The moral:* When you're "on the spot" for extra fast or extra technical service...and for your day-to-day requirements, too...let Republic Supply your industrial needs. More than 35,000 different industrial items...leading brand names...are always on call, as close as your telephone. Always call Republic Supply *first!*

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***A nontechnical report to management concerning profits***

# They did what you can do to save time

If you are threatened with disaster or emergency conditions, time saved means equipment, property and money saved. Management men in all industry can profit from the experience of this Nevada metals-reduction company.

On a Friday afternoon, Westinghouse received this call:

> "One of our pump motors has failed. Water is starting to flood the 1400-foot level in our mine. It will rise and flood the pumping station if the motor isn't repaired quickly. Can you help us?"

Within 30 minutes, our Salt Lake Manufacturing and Repair Shop had the needed parts scheduled in by air from three West Coast cities. When the motor arrived the next morning, our factory-trained men went to work to rebuild and rewind the motor. Working day and night they completed the repair in time to prevent the flooding.

This same time- and equipment-saving technique applies to every industry, every maintenance problem. It is a part of the total Westinghouse services that you can use to your profit — for application, installation, emergency or periodic repair.

We want to do the kind of planning with you that uses our Certified Maintenance service — before emergencies arise — to save time, to save money, to produce more with what you have. Your nearest Westinghouse office can show you how. Westinghouse Electric Corporation, Pittsburgh, Pennsylvania.

YOU CAN BE SURE...IF IT'S

Westinghouse

# EDITORIAL COMMENT

## "We've Got to Get Back to Fundamentals"

SOME FOOTBALL COACHES are fond of saying, right after their team has been beaten outright or else narrowly escaped defeat, "We've got to get back to fundamentals."

This supposedly means that the squad is to spend all of the next week charging the tackling dummies and performing other elementary assignments, while the fancy stunts are relegated to the discard, at least temporarily. Whether this always happens we do not pretend to know; coaches can often rise from the slough of despond on Saturday night to the heights of optimism on Saturday morning.

This is not the beginning of an editorial on football, all evidences to the contrary notwithstanding. But the remark quoted above comes to mind in studying the comments by various Western industrial leaders in the October issue on the question "What Should the West Do to Get Its Share?"

One of the points discussed by the contributors to the symposium was the meeting held at Seattle last April where an unsuccessful attempt was made to launch a Pacific Coast industrial council. Those attending this conference might well have said afterward "We've got to get back to fundamentals" and spend some time searching for a common meeting ground, instead of either being discouraged over the apparent failure of the meeting or else suspicious that ulterior motives instigated the affair.

But to find the "fundamentals" is not an easy matter. We have one suggestion to offer, namely, the necessity for more careful study of the problem of setting aside suitable and adequate areas for future industrial growth. This was discussed by President Russell of the Southern Pacific Company in the Otcober issue.

It is a growing problem, which will become more acute as time goes on. A good conference on this subject, to exchange ideas and experiences, certainly could cause no alarms or suspicions, and it might easily set a pattern for future cooperative efforts.

## Potatoes vs. Protection

SHIP CONSTRUCTION and operation subsidies once used to be thought of as expensive luxuries, but not today. Secretary of Commerce Sawyer pointed out at the Propeller Club convention in Los Angeles last month that potato price support from 1948 through 1950 cost the country $326,000,000, almost equaling our total ship construction subsidy costs since 1936.

The frantic and unavoidably wasteful ship construction program on the Pacific Coast in World War II should have taught us a much-needed lesson as to the desirability of keeping enough shipyard work going in peace times out here so that another war-time emergency would not catch us unprepared.

Apparently some headway is being made in Washington in that regard, as witnessed by the fact that five of the new Mariner class merchant ships are to be built on the Coast in the next two years. But that is not enough. More such work should be distributed among the Coast yards as a legitimate measure of preparedness.

# IN OUR MAILBOX

## He Helped Out

Editor, *Western Industry:*

This will acknowledge a complimentary copy of your booklet on Quality and Treatment of Water in the West. Your thoughtfulness in providing a copy of this useful publication is greatly appreciated.

ROBERT B. DIEMER
General Manager and Chief Engineer
The Metropolitan Water District of
Southern California

*(We don't go tossing complimentary copies of the water booklet around indiscriminately, but this was the least we could do for Mr. Diemer, who supplied water analyses for cities in Southern California that are now using Colorado Aqueduct water instead of their former supplies.)*

* * *

## Originality

Editor, *Western Industry:*

I was very pleased to receive the August 1952 Materials Handling issue of your magazine.

Not only is it a maximum effort on your part to promote the welfare of the materials handling profession, but it definitely reflects a great deal of original thinking of a very high caliber to the problem of placement of the materials handling man in his proper niche in industry.

On behalf of our entire AMHS membership, I wish to thank you for your very effective MH issue method of arousing national interest in the amazing profits possible by adoption of modern materials handling technological advancements.

D. W. PENNOCK
President, American Material
Handling Society, Inc.
Toledo 12, Ohio

* * *

## Great Stride

Editor, *Western Industry:*

I have read with interest the August issue of *Western Industry,* and was very pleased to notice that your publication had taken great strides in recognizing materials handling problems throughout the industry and had concentrated the entire contents of this issue toward solution of these problems.

T. E. PARISH
Vice President,
Material Handling Assn.
Manager, Material Control Div.,
Hughes Tool Company
Houston, Texas

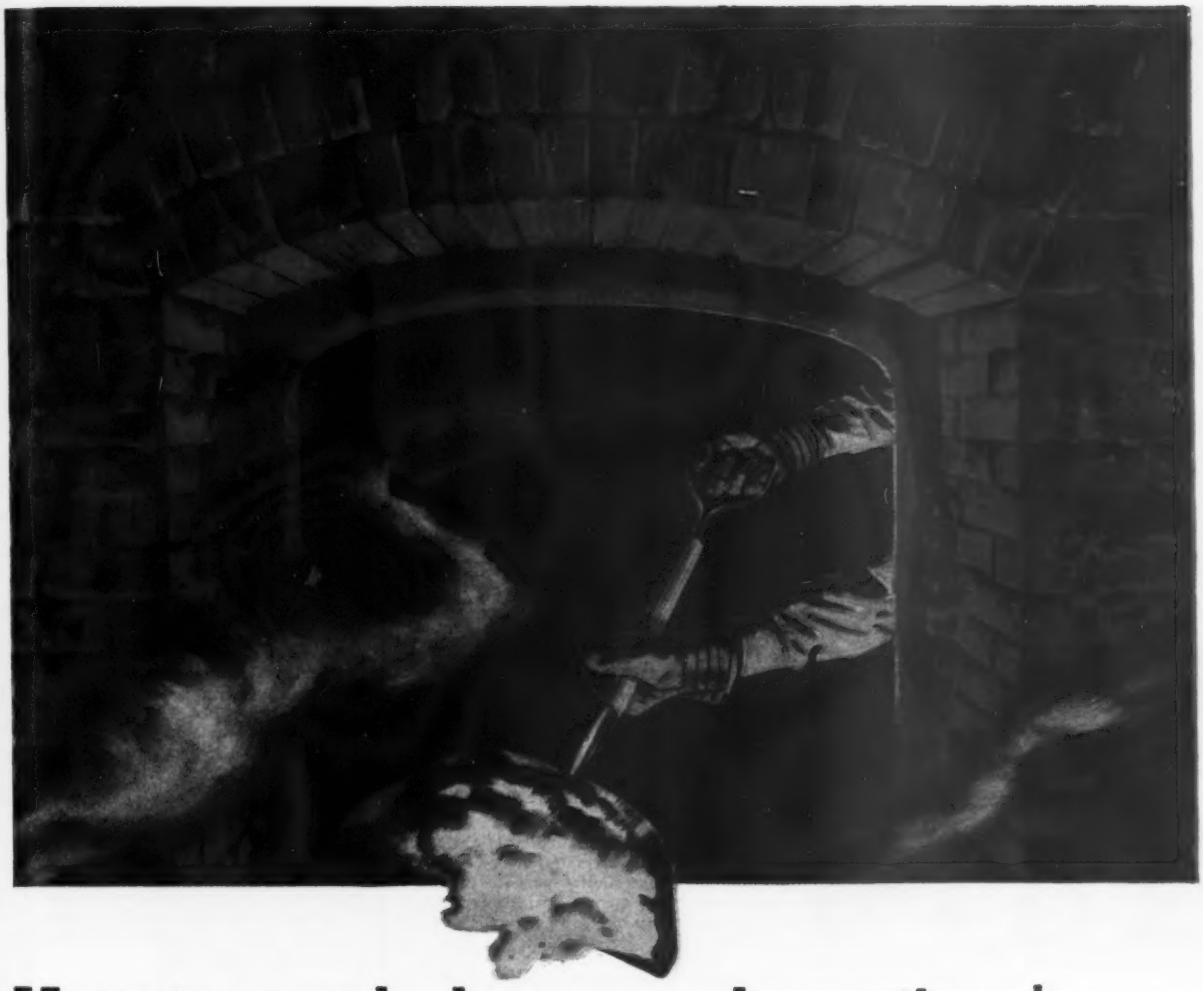
* * *

## Needed for Reference

Editor, *Western Industry:*

Will you please send me a single copy of your August, 1952 issue featuring materials handling. I would like it for our reference files as I feel it is an excellent presentation of modern materials handling trends and contains valuable information.

R. W. PETTERSEN
Douglas Fir Plywood Association
Allied Products Dept.
Tacoma 2, Washington



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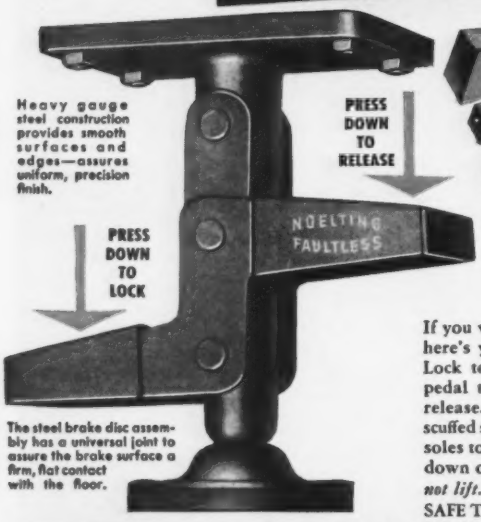
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PRESS DOWN TO RELEASE

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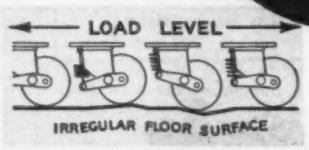

Note how large, long-lasting spring compensates for floor irregularities, eliminates bounce or shock, protects both load and caster.

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## CALENDAR OF MEETINGS

Nov. 20 — Purchasing Agents and Manufacturers, district conference in Oakland. Contact Ken Moeller, Oakland Chamber of Commerce, 427 Thirteenth St., Oakland 12, Calif. GLencourt 1-7800.

Nov. 20-21—Western Region, National Association of Corrosion Engineers second annual Corrosion Conference at Biltmore Hotel, Los Angeles. Contact W. M. Schilling, Southern Counties Gas Co., 4818 Beck Ave., Bell, Calif.

December—Northwest Scientific Assn. regional meeting in Eugene, Ore. Contact L. C. Cody, University of Idaho, Moscow, Idaho.

Dec. 4-5—California State Chamber of Commerce state meeting in San Francisco. Contact James Mussatti, general manager, California State Chamber of Commerce, 350 Bush St., San Francisco.

Dec. 5-6—Northwest Mining Association regional meeting at Davenport Hotel, Spokane, Wash. Contact Hamilton Owen, Spokane Chamber of Commerce, MA. 1393.

1953

Jan. 12-14—The American Dehydrators Association convention in Phoenix, Ariz. Convention headquarters will be at Jokake Inn and Paradise Inn, Phoenix.

Jan. 19-20—Northwest Canners Assn. regional meeting in Seattle. Contact C. R. Tulley, 514 Board of Trade Bldg., Portland, Ore.

Jan. 22-23—Canners League of California's Annual Fruit and Vegetable Sample Cutting at Fairmont Hotel, San Francisco. Contact M. A. Clevenger, 64 Pine St., San Francisco, GA 1-3791.

Jan. 30-31—Fifth Annual Industrial Engineering Institute, University of California, Berkeley.

Feb. 2-3—Same institute, UCLA, Los Angeles.

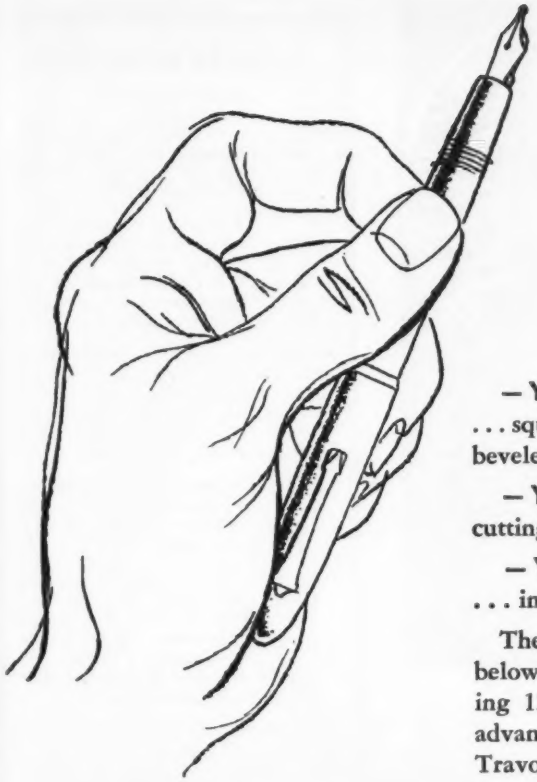
Feb. 2-6—National Association of Corrosion Engineers, a five-day course in corrosion, University of California, Berkeley.

Feb. 4-6—First meeting of Western Computer Conference will be held at Hotel Statler in Los Angeles. Contact George H. West, Sycamore 4-7154.

Feb. 4-6—Transportation and Traffic Engineering Institute's 1953 California state banquet at Berkeley, Calif. Contact Bob Glenn, Bldg. T-7 University of California, Berkeley 4.

Feb. 9-10 — California and Nevada Manufacturers of Carbonated Beverages, state convention at Coronado, Calif. Contact George Culley, 20 S. 1st St., Alhambra, Calif.

continued on page 28



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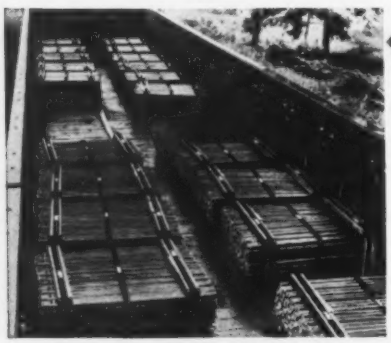
# Don't Let This Happen To YOUR Shipments!

**HORRIBLE EXAMPLE.** These gun barrel blanks were shipped in wire-bound bundles which were improperly bundled and braced in the gondola. *Results:* barrel ends were damaged, and the entire shipment was in shambles. Many man-hours were required to recooper the bundles before they could be unloaded.



**WISE SOLUTION.** At the suggestion of a Signode fieldman, the next shipment was bundled by the tested and approved* method shown here—with heavy-duty *Signode* steel strapping. *Results:* Shipment received in perfect condition. Crane was able to unload car rapidly because each bundle was still intact, thus saving time and labor.

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*First, send for a Signode fieldman!* You will be under *no* obligation. His advice will be sound. It is based on *experience*—and backed by the engineering facilities of Signode! His tested and approved* recommendations are sure to result in improved packaging and shipping methods, and profitable economies in materials used, manpower and time. Write today for the services of a Signode fieldman!

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Offices coast to coast. *In Canada:* Canadian Steel Strapping Co., Ltd.
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## CALENDAR OF MEETINGS

*Begins on page 28*

Feb. 16-19—Oregon Dairy Industries, state convention in Corvallis, Ore. Contact G. H. Wilster, Oregon State College, Corvallis.

Feb. 10-13, 1953 — Western States Meat Packers Association international meeting in San Francisco. Contact E. F. Forbes, Western States Meat Packers Association, 604 Mission St., San Francisco.

Feb. 12-13 — Western Frozen Food Processors Association, San Francisco, ninth annual convention at Hotel Casa Del Ray, Santa Cruz. Contact R. G. Free, Santa Clara Frosted Foods, Santa Clara.

Feb. 12-14—Colorado Mining Association 1953 convention in Denver. Contact Robert S. Palmer, 204 State Office Bldg., Denver.

Feb. 22-26, 1953—National Sand and Gravel Association and National Ready Mixed Concrete Association, both with national exhibits in San Francisco. Contact Vincent P. Ahearn, executive Secretary, 1325 E St., N.W., Washington 4, D. C.

March 9-13—Mayflower Warehousemen's Assn., national convention in San Francisco. Contact Mr. O. V. Merrill, Merrill Transfer & Storage Co., 424 Ninth St., San Francisco.

March 15-20 — American Chemical Society, national convention in Los Angeles. Contact William G. Batt, Franklin Institute, Newark, Del.

March 23-24, 1953—Canners League of California's 49th Annual Directors Conference at Santa Barbara Biltmore Hotel, Santa Barbara. Contact M. A. Clevenger, 64 Pine St., San Francisco, GA 1-3791.

March 23-27—Western Metals Congress and Show, Pan-Pacific Auditorium, Los Angeles. Contact W. H. Eisenman, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Apr. 7-11—Oil Heat Institute regional show at Olympic Hotel, Seattle. Contact Clifton Hussey, Spokane.

April 9-10—Western Cotton Shippers Assn., regional convention in San Francisco. Contact Mr. T. J. Harvey, Executive Vice President and Secretary, 108 E. Fourth St., Los Angeles.

April 21-22 — Twenty-ninth Pacific Coast Management Conference, at the Claremont Hotel, Berkeley, Calif. Contact California Personnel Management Assn., 2180 Milvia St., Berkeley 4, for additional information.

June 28-July 1—Rocky Mountain Coal Mining Institute, Hotel Colorado, Glenwood Springs, Colo.

Aug. 2-9 — Western Conference on Apprenticeship, Balboa Park, San Diego. Contact Joseph H. Stephenson, Supervisor, Trade & Technical Trades, San Diego Vocational School, San Diego.

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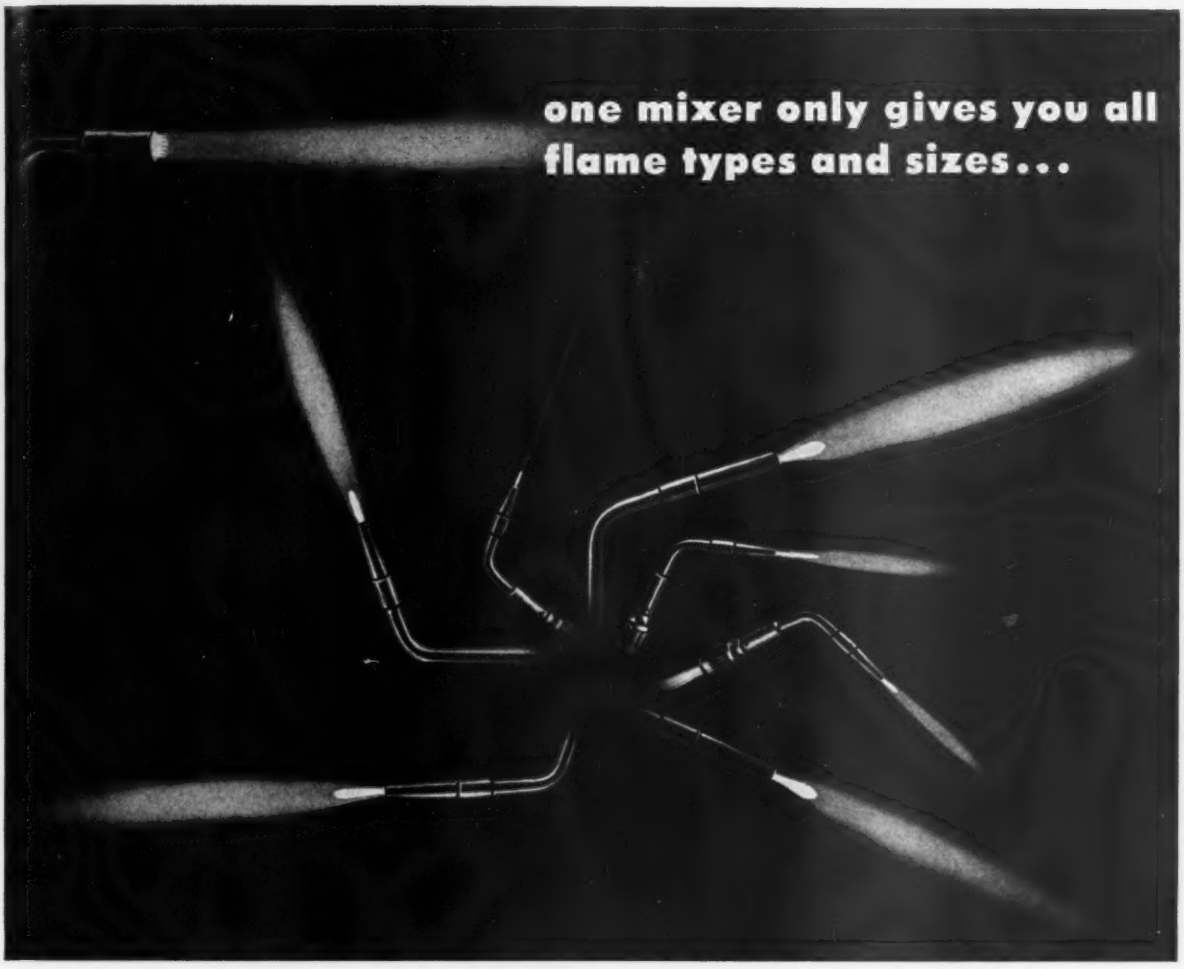


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In these days of great demand, the help of an experienced steel man is especially valuable. Did you realize that the services of such a man are available to you without cost or obligation? This man is your Ryerson steel service representative—a specialist in getting available steel to you quickly.

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He represents, and has the wholehearted support of, the largest steel-service organization in the world. Working closely with him are Ryerson engineers, metallurgists—authorities on carbon, alloy and stainless steels—ready for quick cooperation on unusual problems.

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But your Ryerson service man is always ready to assist you . . . ready to help you scour the country from coast to coast to get the steel you need. So, talk over your steel problems with him the next time he calls.

**PRINCIPAL PRODUCTS**

**CARBON STEEL BARS**—Hot rolled and cold finished

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WESTERN INDUSTRY
NOVEMBER 1952

# DISASTER DEFENSE ON A PRACTICAL BASIS

## *Ford-Richmond pilots mutual aid program*

SAN FRANCISCO Bay Area region is designated by Civil Defense authorities as a "critical target area." Industries in this immediate vicinity are no more immune from enemy air attack than the rest of the geographic area.

Ford Motor Company's big assembly plant at Richmond is located in the heart of a heavy industrial area on the east shore of San Francisco Bay, and it is considered highly vulnerable in case of enemy action. Because of that, it has rolled up its sleeves and come up with one of the nation's foremost Plant Disaster programs.

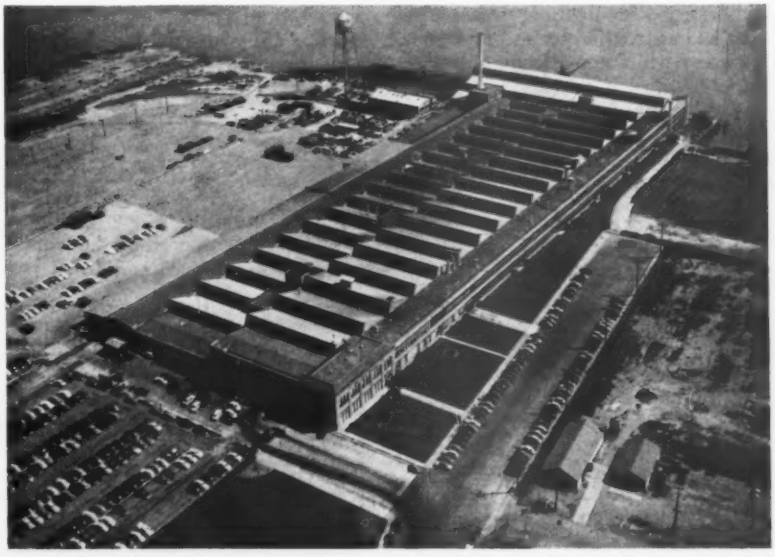
Operating on the principle that the best protection for industry is "self-protection," Ford-Richmond has developed from its 1,500 employees a "shock troop" of highly-trained, skilfully organized employee volunteers. These persons are trained in first aid, rescue work, fire-fighting, police protection, radiological defense, communications, and evacuation.

This in-plant Civil Defense team is organized, and operates, exactly like the Civil Defense organization of a big city, such as San Francisco, across the Bay.

Through its plant protection supervisor, Ed Campbell, Ford has pioneered in the formation of a "South Richmond Mutual Aid Plan," involving themselves and ten other key industries in the same critical area: Filice & Perelli Canning Co., Time Oil Co., Heckathorn & Co. (chemicals), Armstrong (calking equipment and supplies), Butler Mfg. Co., Jacuzzi Pump Co., International Harvester, Montgomery Ward, Nopco Chemical and Adhesive Products. These industries are worth, collectively, more than $12,000,000.

An 18-man advisory council, composed of departmental service and union chiefs, set up training classes and sent a general appeal for volunteers through all Ford departments, when that firm started its program in the "early days" of atomic defense. The Union (United Automobile Workers, CIO Local No. 560), under its president Vincent McKenna, heartily endorsed the program and urged its members to "participate in at least

**AIR VIEW of the Ford Motor Company's assembly plant in Richmond, Calif. Ford-Richmond has developed one of the nation's outstanding plant protection programs, and has formed a mutual-aid disaster plan with 10 other key Richmond industries.**



**ED CAMPBELL, director of Ford-Richmond's civil defense program, is shown addressing a group of volunteers at one of the initial plant security program meetings.**

one of the phases of our Defense program."

W. A. Abbott, Jr., plant manager, is chief executive of Ford's Civil Defense program, with Campbell acting as director.

According to Abbott: "We do not intend that this move to help Ford workers protect themselves shall result in a wave of doubt and fear. It is just a common-sense matter of preparing for the worst, and to make sure the men and women at Ford-Richmond have the best possible protection, information and know-how to meet major disasters—natural or war-caused."

The meeting of eleven industries of South Richmond on a mutual-aid pact was unique in the history of California's State Civil Defense program. These factors developed from the initial conference: In event of disaster (1) Security guards of one company will be available for another. (2) First aid, rescue, fire-fighting, transportation and evacuation teams of any one company will automatically go to the aid of another, if needed.

This "One for All—and All for One" pact, of course, works in conjunction with Richmond's Civil Defense program, set up to protect the civilian and industrial populations of the entire area.

About 150 men and women from the 11 industries (48 from Ford) were on hand for the first meeting held at Ford-Richmond's plant. Also in attendance were Richmond's mayor and city manager, local and state Civil Defense officials, and a liaison officer from Sixth Army headquarters at San Francisco's Presidio.

A 15-week course on plant protection was launched, including such subjects as traffic control, crowd control, rules of evidence (collection and preservation), history and understanding of subversive organizations, sabotage, radiological training, security patrol in plant protection, mechanics and laws of arrest, use of baton (night stick). Ford-Richmond graduated 48 men and women in this course.

Courses in fire fighting and fire control were next conducted under the joint direction of Richmond's fire department and plant protection fire chief, E. F. Jarrett. Sixty Ford-Richmond employees have been assigned to fire equipment and the plant has purchased many new dry-chemical extinguishers in an up-to-date defense move.

To give an idea of the extent of Ford-Richmond's Disaster Planning, here are the services which have been set up for action in case of atomic warfare: health and welfare, special weapons defense, law enforcement, fire control, plant protection, organized self-protection, shelter, transportation, engineering, rescue, warning, auxiliaries to military activities, administration, personnel training, and supply.

With the help of state and local Civil Defense officials, Ford-Richmond made an extensive building survey of its plant, picked out the best possible site for an air-raid shelter (main qualifications: ground floor, away from windows and collapsing walls), replaced obsolete fire-fighting equipment and installed six air-raid sirens to clear out the "dead spots" in its old bell-warning system.

Campbell then was authorized to set up a central "control room" in the plant protection office as operating headquarters and has it equipped with a short-wave radio. In the planning stage now are possible purchase of walkie-talkies to aid the communications set-up.

Ford already has ordered the new bell and light attack warning system from Pacific Tel & Tel—one of the warning systems used by the State Office of Civil Defense. By the mere turn of a dial from a central point, industries throughout California would be alerted simultaneously of approaching planes in a matter of seconds.

### ANOTHER PRACTICAL PLANNING STEP

**Workable protection programs are also well set forth in a 30-page booklet prepared by the Plant Protection Service of the San Francisco Disaster Council and Corps.**

**This booklet has sections dealing with (1) organizing plant protection, (2) operational plan. It discusses warning systems, duties of plant defense personnel, organizing the fire, police, warden and health services and the shelters.**

**The plant management committee of the Disaster Council and Corps has to date acted in an advisory capacity to assist 800 San Francisco plants employing more than 250,000 persons, and including nearly 50,000,000 square feet of industrial and business property.**

Once the bell and light system is installed, Ford-Richmond will have a complete air-raid warning communications set-up, rivalled by none.

Twenty Ford workers already have received first aid certificates since the program got under way, and more than 30 have received extensive training as emergency fire fighters.

Ford-Richmond points with pride to its more than 1,500 manhours of disaster training among employees—all done on a voluntary basis, and in the evening off-work hours. This, again, demonstrates excellent cooperation and support of the local Union in backing the program among its members.

Management has authorized such side trips for its Civil Defense personnel as a San Quentin Prison tour (to check security patterns) at plant expense, judo and fire demonstrations, etc.

Extensive maps and plots have been drawn of utility valves, "hot spots" in plant, location of fire apparatus, hydrants and standpipes, accessibility and location.

Employees are instructed in "good housekeeping" techniques to check fire hazards, and much stress is laid on the importance of inspection and maintenance of vital equipment.

Drills are mandatory, and are held once each month. Every member of Ford's Civil Defense team knows his job, whether he be a floor warden, stair warden, fire fighter, security guard, first-aider, transport driver, radiological man, or radio operator.

In event of disaster, plant defense personnel will direct the entire organization from the control center which maintains constant communication with the control center for the city of Richmond.

Once the alert in Ford-Richmond's plant is sounded, all Civil Defense Service chiefs will be called to their posts, and employees "evacuated" to the air-raid shelters. Standing by will be fire-fighting crews, auxiliary police, special weapons defense teams, medical teams—tightly organized, well-disciplined, ready to give peak performance to employees.

**FORD-RICHMOND's civil defense planning team meets in the office of plant manager, W. A. Abbott, Jr. to discuss latest disaster plans. Left to right: Parley Dask, asst. plant manager; Ed Campbell, Ford's civil defense director; Neil Hammond, manager, industrial relations, and Mr. Abbott.**

An additional service Ford provides for its employees is an educational program for their families at home and their children at school. Workers are informed how to provide families with "family plans"—and to have their wives learn first aid and home nursing techniques. The City of Richmond, meanwhile, has organized an extensive Civil Defense organization for wardens, auxiliary fire and police, medical and welfare teams, and radiological and demolition squads. Richmond schools are heavily indoctrinated in disaster programs, and pupils from kindergarten through high school are instructed in how to take shelter and protect themselves with instruction of the faculty.

Richmond itself has been divided into three industrial areas, with Ford-Richmond in the center of "Industrial Area Number One," the heaviest industrialized region.

Industries in areas two and three are now planning organization on mutual-aid lines, similar to the "Big 11."

No, you don't have to worry about Ford-Richmond. If atomic warfare should ever come to this country, they will be prepared. Can other industries say the same?

**LATEST DRY-CHEMICAL fire-fighting equipment, purchased by Ford-Richmond, in a "modernizing" drive of its disaster-protection facilities, is inspected.**

**HERE IS A VIEW of Ford-Richmond's control center—the point from which any disaster-operations will be directed. Note the short-wave radio set-up at right.**

**A DRAMATIC EXAMPLE of the protection afforded by the Solaramic process against jet engine temperatures. Two thin samples of AISI Type 321 stainless steel were tested at 1850 deg. F. Coated piece (left) is shown after 150 hours of testing; uncoated sample (right) was virtually destroyed by oxidation after only 20 hours. Samples are .002-in. thick sheet, same thickness used in making jet insulating blankets.**

*Here's the how and why of*

# CERAMIC PROTECTIVE COATINGS

## *for longer metal life*

By
JOSEPH A. PASK
Associate Professor of Ceramic Engineering
University of California
Berkeley, Calif.

MATERIALS that are capable of resisting high temperatures and corrosive gases or liquids, either for short or extended periods of time, are becoming more necessary to many engineering developments.

Increased power outputs, greater efficiencies, and higher speeds are associated with operations at or development of high temperatures. This is particularly the experience of the aircraft industry. However, it is a problem also being faced by certain chemical, petroleum, electrical, automotive, food, and various other processing industries.

With temperature exposure as a factor the number of usable alloys and metals decreases appreciably. Main limitations are generally poor oxidation resistance, and loss of strength and resistance to warping. In some instances temperatures may be reached at which a metal is in a liquid state.

There are, however, a number of metals, such as platinum and palladium, that have certain favorable high temperature properties but whose usability is restricted by cost.

Other metals, like molybdenum, are highly refractory but are unsatisfactory because their oxides form and vaporize readily, causing the metal to disappear.

Thus, economic and other considerations resulted in a need for development of special alloys that had heat-resistant properties. With critical shortages of certain alloying metals, such as columbium, cobalt, tungsten, chromium, and nickel, such developments became impractical.

Attention was then focused on other more available alloys with satisfactory high temperature properties but whose oxidation resistance was poorer. A solution of this latter problem became necessary.

On the basis of experiences realized with the use of porcelain enamels (glassy coatings primarily on steel and cast iron) and with the making of glass-to-metal seals, it was logical that the development of ceramic coatings for certain higher temperature metals and alloys would be the answer to the problem.

A guide to the use of such metals has been prepared by the Barrows Porcelain Enamel Company of Cincinnati, Ohio. Temperatures suggested in the accompanying table are based on heat resisting properties only and are the maxima at which intergranular corrosion and rupture or failure due to fatigue strains can be avoided. The summary is based principally on tests running constantly for 150 to 200 hours. If the heat application is intermittent, it is suggested that the maximum temperatures listed should be reduced approximately 100° F.

Considerable research has been conducted along these lines by Federal government agencies, universities, and industrial concerns. Most of the early work was done with the airplane industry in mind. Of the industrial concerns, Ryan Aeronautical Co. and Solar Aircraft Co., both of San Diego, have been leaders of and suppliers for the rest of the industry.

### Western Activities

Perhaps the first promising ceramic coating for continuous performance under a temperature of 1,800° F. was A-417 developed by the National Bureau of Standards, which has the following composition:

| *Ingredients* | *Weight Percent* |
|---|---|
| High-barium, alkali-free frit | 70 |
| Commercial chromic oxide | 30 |
| Enameler's Clay | 5 |
| Water | 48 |

This was improved by N. B. S. as A-418. Further work on this coating by Ryan Aeronautical Co. and the California Metal Enameling Co., who have merged their ceramic programs, has resulted in the laboratory and field tested A-418-Ryanco-C. In addition this work has resulted in a number of perfected innovations in preparing, ap-

plying and firing these coatings, which are said to give them maximum toughness and adherence.

Solar Aircraft Co. likewise had extended its interest in jet engine parts to the undertaking of non-government-sponsored research on high temperature ceramic coatings some time ago. These studies have resulted in a number of Solaramic coatings, among them S-52 and S-5210-2C, and processes which are proprietary and for which process and coating patents are pending.

Solar has made an agreement with Ferro Corporation whereby the latter has exclusive license to manufacture and sell Solaramic coating materials, and to continue cooperative research.

It is not the purpose of this account to evaluate the merits of any types of coatings. It is most likely that certain coatings will work best for a particular problem, and other coatings for other problems. All probably should be investigated for any possible applications.

Such coatings have already been commercially or experimentally used in such applications as:

High temperature exhaust systems for piston engines, combustion chambers and transition liners for jet power plants, automotive valves, petroleum refining equipment, spark plug parts, unit heater components, oil burner parts, industrial bellows for chemical process industries, locomotive engine parts, industrial gas turbine parts, therocouple components, chemical processing equipment, heat exchangers, industrial furnace parts, and others.

These applications allow the substitution of cheaper and less critical metals and give the parts longer life, and in some instances provide an esthetic benefit.

The manufacturing steps generally are similar to those employed by the porcelain enamel industry. The making of frit is the first step.

Frit is formed by first fusing a raw material batch which in the molten state is essentially equivalent to the final coating composition, and then pouring it from the furnace into a water bath to form shattered glass particles. The quenched and shattered condition of the frit or glass facilitates subsequent grinding.

The frit particles are ground with a suspension agent in a suspending medium, usually clay and water, to form the enamel slip.

The slip is then applied to the properly cleaned and prepared metal piece. Cleaning is a most important step and may possibly involve alkali baths to remove greases and oils and pickling baths to remove oxide scales and perhaps to achieve some etching. Sandblasting is sometimes done to roughen the surface.

Application is made either by dipping the piece and allowing the excess to drain off, or by spraying. In special instances the slip may be applied by painting or slushing.

If any portions or parts are not to be enameled, they are masked in some way during the application of the slip, or subsequently removed prior to firing.

The coated piece is dried and introduced into the furnace. (The furnace can be either of a batch or continuous type.) The furnace temperature and time are controlled. They generally range from 1,400 to 1,800° F., and 3 to 10 minutes depending upon the compositions.

During this period the frit particles fuse and form a continuous coating on the metal. The time of firing required is largely dependent upon the mass of metal being enameled.

The fired pieces, on emerging from the furnace, are allowed to cool normally. No annealing is necessary because the glass coatings are so thin that sufficiently large thermal gradients do not develop in them to cause destructive strains.

**TYPICAL of big ceramic-coated structures which Ryan is producing for aircraft is this exhaust system for a Pratt and Whitney 3,500-hp. engine.**

**The value of coating . . .**

DEVELOPMENT and applications of protective ceramic coatings for metals and alloys, such as is being done by Solar Aircraft Co. and Ryan Aeronautical Co. are of great importance and value.

They provide means of increasing metal life by reducing or eliminating oxidation and intergranular corrosion and by stabilizing metal surfaces in temperatures greater than 1,200° F.

Lower alloys, less rich in strategic elements, thus coated, have service lives equal to or longer than higher ones.

Protection is also provided against chemical corrosion.

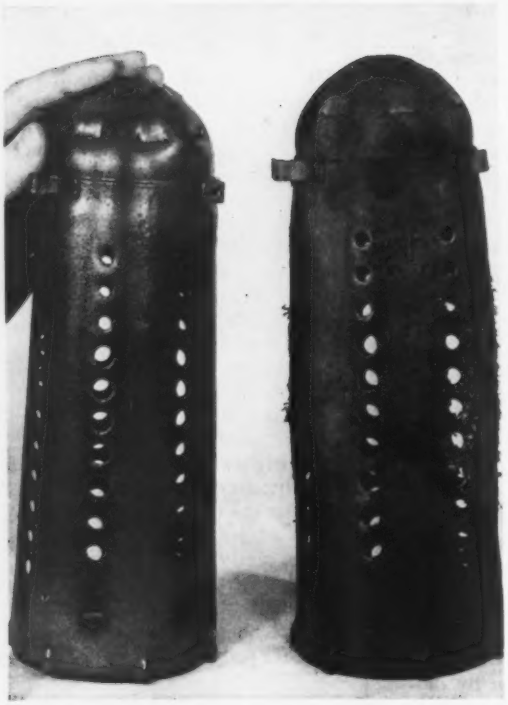
In addition to these advantages, glassy or enamel coatings can improve appearance and esthetic values, reduce friction coefficients, and modify heat transfer properties.

### Theory of Coating Adherence

In all instances of joining metal to glass the problems are similar but of varying difficulty. At firing temperature the frit must fuse to form a continuous liquid coating that will wet the existing metal surface and form a sufficiently strong bond that will result in good adherence of the solidified liquid or glass coating to the metal.

Although the thermal expansion of the glass does not have to match that of the metal, it must be reasonably close and less than the metal so that the glass coating is placed in compression on cooling. The latter condition is a requirement because all ceramic materials are considerably stronger in compression than tension.

Thin coatings of glass or enamel develop flexibility and readily deform with the metal without shattering and peeling as would be experienced with thicker coatings of glass. This has been



**COMBUSTION chamber liners, made of type 321 stainless steel, are for Solar Aircraft Co.'s AAP-80 gas turbine engine. They are tested through cycles of 15 min. at 1900 deg. F., followed by 15 min. in cool air, for a period of 20 hr., thus subjecting the liners to extreme thermal shock. The liner on the left is in good condition after the test, which was run at about 400 deg. F. hotter than normal operating temperatures for the part. The uncoated liner was severely distorted and badly oxidized.**

**COATED MATERIAL about to undergo test in Ryan laboratory. Hugh Penton (left), vice president of California Enameling Co., observes the test with Wilson G. Hubbell, chief metallurgist for Ryan.**

recognized in the porcelain enamel field, and the trend has been toward thinner and thinner coatings with subsequent improvement toward chipping resistance, mechanical abuse in general, etc.

Fundamental principles of adherence development are similar although the actual steps may vary for different combinations.

In normal porcelain enamels on steel the presence of cobalt oxide at about 0.5 to 1.0% in the ground or base coat is necessary to promote good adherence. Because of the cobalt this coat is bluish-black and thus porcelain enamels require a second or cover coat to obtain a desired color, and perhaps texture.

The second glass coat readily adheres to the first glass coat. Considerable research is now in progress toward the development of commercially reliable one-coat white enamels.

Other development programs are coatings for aluminum which requires enamels with much lower fusion temperatures because of the lower melting point of aluminum in comparison with iron.

In making glass-to-metal seals, on the other hand, the metal is generally preoxidized to a definite oxide thickness before application of the glass. This treatment results in adherence of the glass.

It is believed that the oxidation develops a roughness of the metal which aids the glass to adhere after it comes in contact with it by solution of most of the oxide. Some workers believe that part of the oxide layer remains at the interface and acts as the bond between the glass and metal.

**Suggested Maximum Temperature for Use of Metals Suitable for Ceramic Coatings in Industrial Installations**

| Metal or Alloy | Maximum Temperature deg. F. |
|---|---|
| 1010 steel | 900 |
| NX series steels | 1000 |
| 4340 steel | 1100 |
| 430 chrome steel | 1100 |
| Timken steel | 1300-1400 |
| 347 stainless steel | 1700 |
| 304 stainless steel | 1700 |
| 309 stainless steel | 2000 |
| 310 stainless steel | 2100 |
| 314 stainless steel | 2100 |
| 446 stainless steel | 2000 |
| Inconel "C" | 1800 |
| Inconel "W" (heat treated) | 1500 |

# HERE'S AN "ICE" THAT WON'T MELT

***Industry comes up with a refrigerant that lasts longer, is colder, isn't messy and stays in one piece after use***

**THIS TYPE of refreezant can be used industrially, commercially and in your own home.**

AN ICE that doesn't melt, but yet retains all the refrigerating qualities of natural ice and, more, is the ingenious new product developed by a young chemical research firm in Oakland, Calif. Instead of melting, the "ice" merely grows soft as it thaws, to become a jelly-like substance having an adhesive quality so that it does not flow, but remains in one piece.

### Product of Research

This product, given the appropriate name of "Sno-Gel," has been developed after four years of research by Chemical and Fibre Associates, Inc., Oakland. The product is being produced commercially by Sno-Gel, Inc., also Oakland. John Staker is president of the marketing and manufacturing company, and Earl H. Kieselhorst is secretary-treasurer. Primarily responsible for developing the product through the research organization is J. C. Shepherd, in charge of research and development of Chemical and Fibre Associates, Inc.

### Any Shape

Sno-Gel is a chemical product produced from water by holding the liquid in colloidal suspension inside of a gelatinous substance. Actual details of its production are a trade secret. It can be poured or molded into many different forms, shapes or sizes, such as bricks, slabs, tubes, or it can be crushed, depending upon the way it is to be used. It can also be placed in heavy canvas rolls about three to four feet in length to protect it from rough handling.

Although the jelly does have an adhesive quality, it is better protected when it has been poured into a plastic bag or form. This bag helps to keep it in a single piece. When it is to be used, Sno-Gel can be placed in any standard freezing unit. After it is solid, the "ice" can be used for any purpose for which natural ice is used, and in several other ways besides.

Ordinarily, Sno-Gel will freeze at a temperature of 30 deg., but by varying the chemical formula in treating the water, it can be made to freeze at lower temperatures. At present two other types of "ice" are being produced by Sno-Gel, Inc., to freeze at 10 deg., and at 8 deg. below zero. The reason for this is to make it possible to use the "refreezant," as it is called, to hold frozen foods as well. As the ice thaws, it draws heat from the surrounding air. In order to thaw with a freezing point of eight below zero, the refreezant draws just that much more heat from the air. Sno-Gel at this temperature can keep frozen foods at below zero temperatures for at least a full day or longer. In the heavy canvas bags, it can be used to transport frozen foods, or perishable foods, without the use of heavy waterproof containers.

**EARL H. KIESELHORST, secretary-treasurer of Sno-Gel, Inc., demonstrates the method of carrying truck "logs" used for keeping foods under refrigeration in transit.**

Mr. Kieselhorst reports an experiment with the 30-deg. Sno-Gel to compare its rate of thawing with natural ice. A block of ice and a frozen Sno-Gel bag were thrust into containers of boiling water. After four minutes the block of ice had melted completely. After about 19 minutes the Sno-Gel was still frozen in the very core.

### Can Be Re-used

There is theoretically no limit to the number of times the "refreezant" can be used, hence the term. It can be refrozen after it has thawed, and refrozen again almost indefinitely.

The product is made in several attractive colors which serve not only to identify the freezing point of the Sno-Gel, but to make the item attractive in itself.

As with any new product, its full uses, both industrially and at home, have not yet been completely explored. As further developments and improvements are made, other adaptations will be discovered.

### Expansion Planned

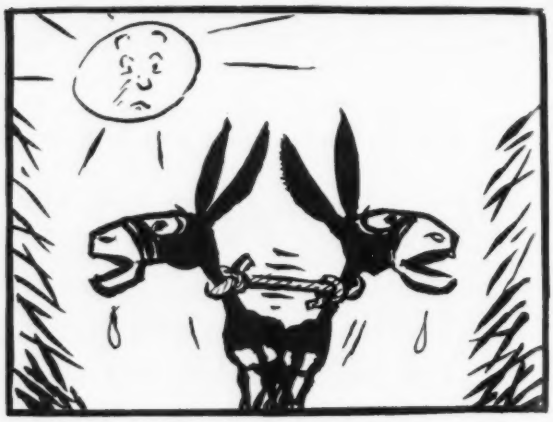
For the time being, Sno-Gel is being manufactured only in Oakland, and is being distributed from the factory. Initially, it has been used only in and around the San Francisco Bay Area, but its success means that it will spread to other areas. It is the plan of the company eventually to build factories and distribution points in several cities strategically located throughout the United States in order to make the refreezant available in good quantities all over the country.

### COOPERATION DOES IT

When the other person comes around to your way of thinking, that's cooperation! The other guy always seems to be the one who is stubborn. You yourself are just firm!

Actually he would very likely understand what you want—and go for it—if you presented your idea in the right way. His supposed stubbornness may easily be just your own failure to tell your story intelligently.

A little guidance here, a suggestion there, may work wonders. You may find his cooperation comes easier than you expected.



THE OLD STORY about not being able to decide between two bales of hay still applies to humans as well as to animals. Just failure to realize that they both want the same thing.

# GETTING YOUR in the plant

GETTING management to accept ideas originating in the plant—or getting plant men to accept ideas stemming from the front office is sometimes difficult. Top management, for example, will be on the spot as pressure for increased production becomes greater, as performance ratings fall below the level of efficiency, as absenteeism increases, and as human relations problems develop.

Top management, of course, has ideas . . . sound ideas, on how to overcome these problems, but selling the ideas to employees is one of the toughest of top-level problems.

By the same token, plant men sometimes have ideas for the benefit of production or efficiency, but they too have a tough problem to sell their ideas to management.

Here are five tested methods of dealing with this problem of selling ideas. They will work in selling ideas to supervisors, employees, or to superiors. In fact, they will work to sell anyone.

## 1. ASSUME ACCEPTANCE

We have all been forced into buying something because the smart salesman took our acceptance for granted. Selling phrases, such as "Which way do you want to handle this—cash or charge?", or the waitress who asks, "Are you ready for your dessert now?", are based on the idea of acceptance. A saleman who assumes acceptance will usually get the prospect to accept his idea.

Or, perhaps your wife assumes acceptance when she says something like this: "You'll have time to shave before dinner tonight." This strategy works.

Translate this technique to a way it can be applied in selling ideas. For instance, a supervisor who wants a report right away could say, "You'll have time to make out this report this afternoon." Or, he might use the other variation by asking, "When will you have this report ready—this afternoon or tomorrow morning?"

Try this one for size.

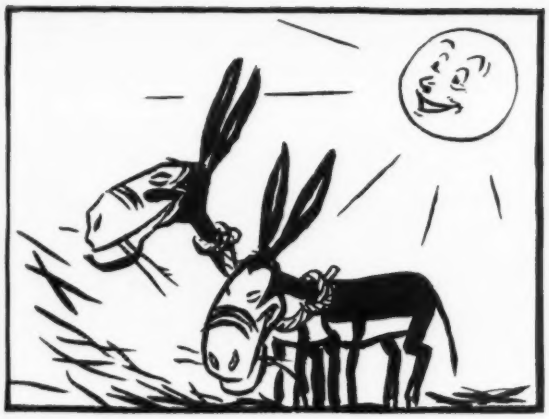
## 2. YOUR IDEA

Most of us are proud of our ideas, and are quick to accept the fact that we have a good idea. Under this method of selling ideas, the technique is to start new ideas through accepting the ideas presented by the other person. When discussing a problem with an employee and the individual makes some suggestion that even remotely resembles the idea we want to sell, this technique will work successfully.

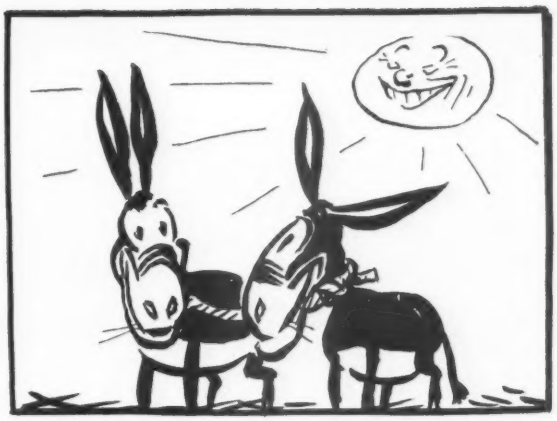
For instance, the supervisor is talking to the gang leader and drops a hint about the idea of reducing absenteeism. When the gang leader picks up this idea, even remotely, the supervisor says, "That's a swell idea." Then, through expanding on it, the supervisor brings out all the details he had in mind. And, then he closes the interview with, "*Your idea* is a dandy. I'm sure it will work. Let me know how it handles the problem."

He's all for it. It's his idea, and he wants to see it go through.

## HERE ARE FIVE SOUND AND SIMPLE



A LITTLE BIT of common understanding settles all of the apparent difficulties, and everybody gets satisfaction. One of the two did a good selling job. That's all it took.



NEITHER ONE had to prove that the other was stubborn or obstinate. Cooperation resulted when the situation was explained in terms that the other fellow could understand.

# IDEAS ACROSS or in the front office

### 3. AS YOU KNOW

This method gives the other person credit for already knowing what the idea is when he hears it. "This is nothing new to you, but . . ." is an example of this selling technique in action. It builts up the ego of the individual, and many a person will hesitate to say he doesn't believe in it because he has been given the reputation of being an authority on the subject.

"As you know from your experience . . ." start the introduction of an idea into the conversation. Agreement is the natural reaction on the part of the listener. And, putting the idea into practice is merely a matter of time.

"As you said sometime ago . . ." gets the idea-selling interview off in the same successful way. It gives the other person full credit for knowing what the idea is. Thus, it builds up his ego and sells the idea quickly and easily—particularly if he is agreeable to start.

### 4. MODESTY

Listen to this modest manager sell an idea: "Frankly gentlemen, I'm not an authority on materials handling. You men know this work and all of its problems. You are the authorities on this subject, but it seems to me that there must be some answer to this problem of slower performance. Here's an idea you might want to consider . . ."—and then the manager tells his idea.

This age-old technique of putting ideas across has worked for others . . . and it will continue to work in selling ideas. We like people who are modest; we are more apt to go along with them than we are with stuffed shirts who know it all.

"I'm not an expert, but I've had considerable success doing it this way . . ." sells the idea. It doesn't force the idea on the others, but dangles it out as bait. Thus, there is no resentment —only acceptance of the idea.

The modest approach wins friends.

### 5. WE

Only two letters, but when combined in this cooperative tone, "we" is one of the most successful idea-selling techniques. This eliminates the thought of an order, and puts acceptance on a team spirit with everyone working together to solve the problem in the plant.

When a supervisor says, "If we all work hard . . ." everyone feels like rolling up his sleeves because he knows that the credit for accomplishment will be divided equally. One person doesn't do the work and another get the credit . . . everyone cooperates and shares everything equally. And, the idea is sold successfully.

Our cartoons at the top of the page are eloquent illustration of the "we" idea. Neither animal could do the job by himself, but when they got together they accomplished what they started out to do.

So it is in business. Enlist counsel and assistance, and you'll get farther.

## METHODS THAT WILL WORK FOR YOU

***LARGEST SIREN** of them all is this Soundrive set-up in a remote California mountain area. Between compressors (in shed at right) and escape baffles of test chamber (left) air is made to produce sound for controlled testing.*

# WORLD'S BIGGEST NOISE for industry's benefit

IN AN ISOLATED mountain area several miles away from Newhall, Calif., what is believed to be the world's largest siren was recently put into operation by personnel from Soundrive Engine Company of Los Angeles, in an effort to solve some of the noise problems that have plagued modern industry over a period of years.

Although the project is sponsored by the Office of Naval Research, the isolated test site was not selected for security reasons alone, because the big noisemaker could cause serious injuries (such as ruptured eardrums) among sidewalk superintendents if it were operated in a populated area.

A pair of Rolls-Royce aircraft engines had to be adapted to the task of providing compressed air for the 90-foot-long test installation because no commercially-available compressor could maintain the one atmosphere (or 760 mm. Hg.) pressure that had to be built up in a plenum chamber adjacent to the siren.

Function of the plenum chamber is to feed large quantities of air into a sequence of vanes or blades, which are rotated by an electric motor so as to break the air up into a sequence of vibrating particles or audible sound waves with a frequency of about 100 cycles per second by alternately opening and closing four siren ports.

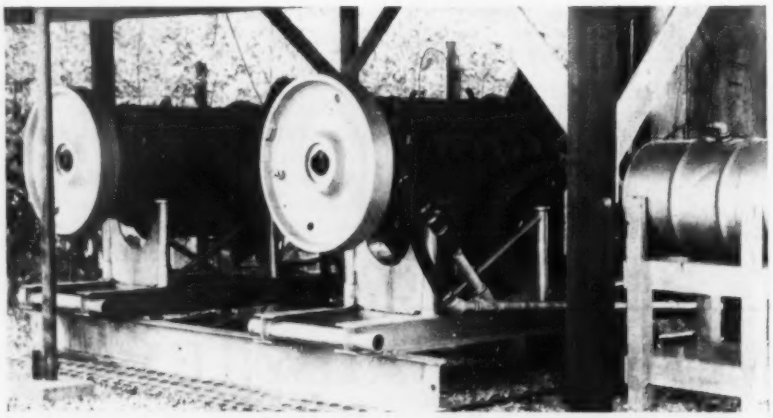
Sounds emerging from the ports are conducted by four steel tubes to a section of oil-well casing, which serves as a test chamber. Contents of the test chamber include steel baffles, which concentrate sonic energy in certain sections of the chamber without preventing the escape of excess pressure from the far end of the pipe, and special microphone pickups which actuate automatic recording instruments outside of the chamber.

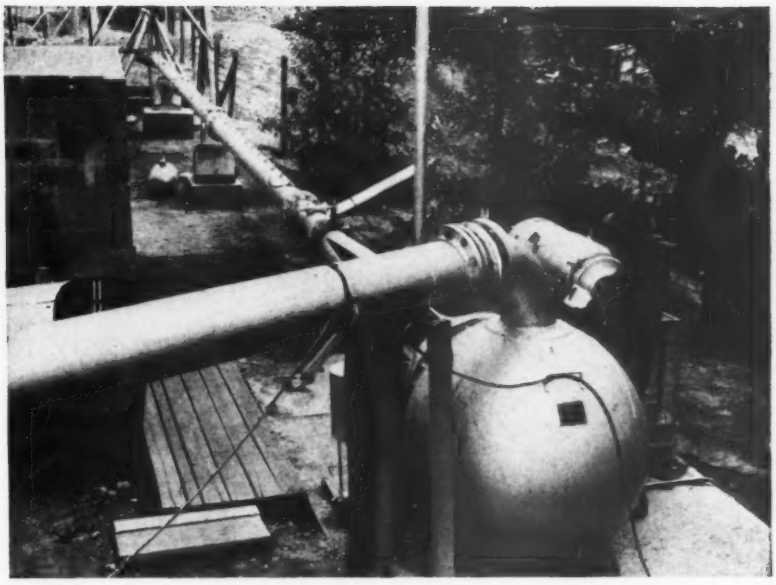
Special pickups had to be designed for the test chamber, because conventional microphones were instantly shattered by intense sound waves from the siren; and, even yet, many contents of the chamber—including steel baffles as well as microphone pickups—are being damaged so much by the sound waves that they must be periodically replaced.

Operations of the siren are remotely controlled by engineers in a soundproof room near the test chamber; and, according to Soundrive officials the tests are intended to:

(1) Uncover basic data which will

**TWO ROLLS-ROYCE** aircraft engines are adapted to task of providing compressed air to maintain one-atmosphere pressure in plenum chamber which in turn feeds air to the giant siren.





**THE HEART of the Soundrive test installation. Steel pipe (left) conveys air from compressor engines to globular plenum chamber. Air particles, converted into high-intensity sound vibrations, go into tubular test chamber (background).**

lead to improvements in the design of acoustical silencing systems;

(2) Ascertain the resistance of various materials and assemblies to extremely-intense sonic vibrations;

(3) Explain why very loud sounds do not behave in accordance with the physical principles that govern the activities of lesser noises.

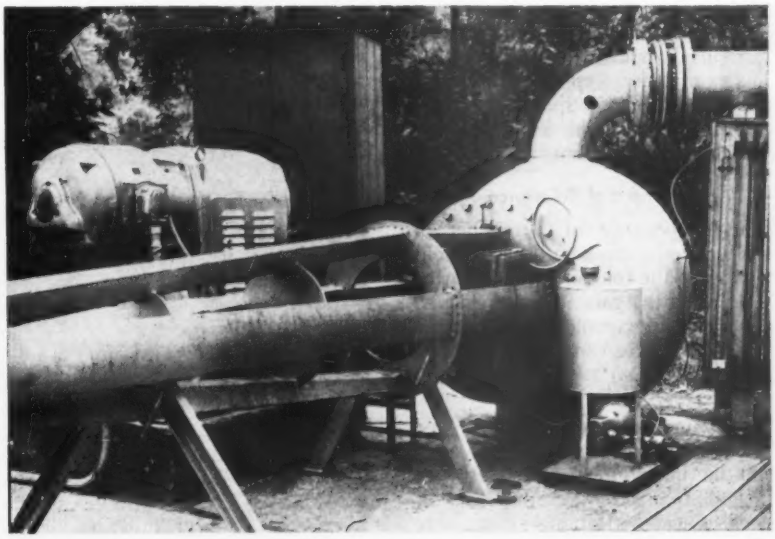
Improved acoustical silencing systems are especially desirable just now in factories whose operations involve the generation of loud noises—for example, in Western aircraft plants where jet engines are tested. Aside from the fact that intense sound waves promote fatigue among factory workers, many vital defense industries are currently unable to maintain complete 24-hour production schedules, because some of their operations are capable of disturbing the sleep of persons living as many as five miles away.

Increased knowledge regarding the reactions of materials to intense sonic vibrations is essential to the design of more efficient engines and high-speed airplane structures as well as improved silencing systems, since loud noises are extremely destructive.

Evidence to date indicates that intense sound waves comprise a myriad of small sounds which raise havoc because they are constantly acting against one another. This causes very loud noises to assume wave patterns that would resemble bolts of lightning, whereas lesser noises would resemble ripples in water, if they could be seen.

When the reasons for this are fully explained, many new developments can be expected. For example, power plants can be redesigned so that no substantial portion of their output energy will comprise unusable noises; and audible sounds of high intensity may be generated for a variety of practical purposes, the same as inaudible ultrasounds.

In point of fact, Soundrive engineers have already discovered what may become one of the more practical applications for very loud noises—an oil-well pump of exceptional structural simplicity. No specific details regarding this development have yet been announced, but company officials admit that the results of preliminary tests with the pump have been "extremely encouraging."



**THE SIREN installation. Compressed air from plenum chamber at right is conducted from siren ports via four separate steel channels to test chamber at left (out of picture).**

# SPRINGS

## *are not expensive if designed right—Specifying proper tolerances is one way to cut costs*

By CHARLES O'HARA, Assistant Manager, San Francisco Plant, Connor Spring Mfg. Co.

GREATEST possibilities for cost reduction in coil springs exists in an understanding of the tolerances to which springs can be held and their effect on performance.

Most thinking regarding tolerances of mechanical parts is associated with machine shapes. In the case of coil springs, the same accuracy cannot be expected in the diameter of the spring, as for example, in the diameter of a turned shaft. Since the functions of the two are different, the type and amount of tolerance is also different. Too often, however, the standard "title block" tolerances on drawings intended for machine parts are also used for springs. Unless later clarified, this can lead to unreasonable tolerances and unnecessary costs.

To determine the proper spring tolerances we will first list the values which can be expected in "commercial" springs. We can then study the effect of these tolerances on important spring characteristics and decide whether they are acceptable for the particular application. Closer tolerances can then be specified where required to satisfy a special function. By this method, the added cost of holding close dimensions can be held.

### Commercial Tolerance

The experience of a number of spring producers has been consolidated into the tolerances given in the tables below. Again it is emphasized that these are commercial tolerances. Closer tolerances can be held through lower production rates, quality control, etc.

The number of variables involved in spring design make it advantageous for the buyer to specify only the "Mandatory Requirements," that is, the dimensions which are necessary to the operation of the spring, leaving the rest to the springmaker. For example, if outside diameter must not exceed a certain maximum value, inside diameter must be over a minimum diameter, specific loads (with tolerance) are required at two points and the spring must go down to a particular height, these factors should be listed as "Mandatory Requirements" together with the type of material desired and maximum stress or a description of the conditions under which the spring will work. The reliable springmaker can then engineer a spring to meet these requirements using available material and proportioning dimensions to get the most economical spring.

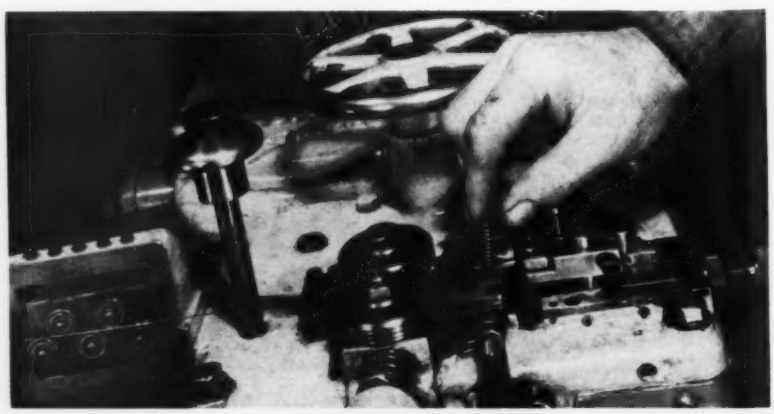
Where all dimensions are "tied down" in the specifications it many times happens that extra close tolerances must be held, heavy grinding is required, etc. A simple change in wire size or number of coils or diameter might speed up production of the part

. . . continued on page 46

**Part of series . . .**

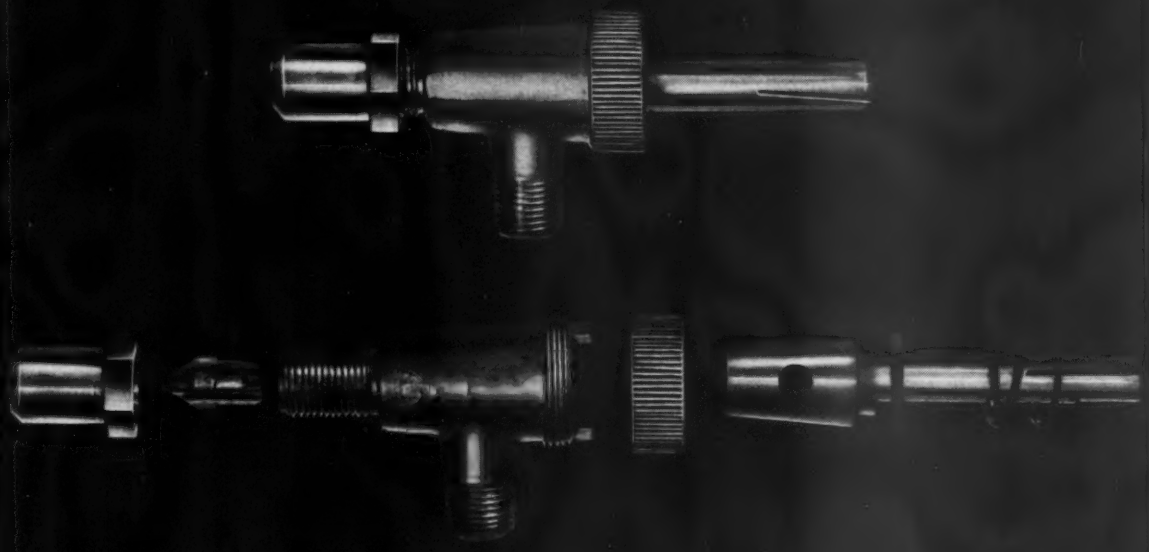
***THIS IS THE SECOND installment of a 3-part series on springs. It discusses their uses, their applications, their manufacturing data, their relative cost. First section dealt with springs in general, identifying types, kinds of material from which they are made, and some of the production technicalities. This section deals more with specific points of tolerances, capacities, and information designed to help the buyer make his purchase at minimum cost. Third section, to appear next month, will have to do primarily with finishes and will include other points of detailed technical information.***

**SPRING COILING MACHINE. Wire is being fed through the grooved rollers (far left) to be formed into an open-wound compression spring (drawing of this type on page 47).**



LINCOLN FINDS

# Brass is Best



Kitchen range burner valve by Lincoln Brass Works, Inc., Detroit 16, Mich. Two different brasses are used in this valve, which is entirely of brass except for the washer and spring. Lincoln also makes valves for heaters and furnaces; flow, drain and shut-off valves for gasoline lines; shut-off valves for agricultural sprayers, and a wide variety of tube and pipe fittings, all entirely or chiefly of free-cutting brass rod and free-machining brass forgings.

Mr. D. E. DuPerow, Vice-President of Lincoln Brass Works, Inc., recently said:"Thirty-six years of brass use by Lincoln and complete acceptance by the trade is the best reason I can think of for brass superiority. If there had been any material better for our purpose, less expensive to fabricate, and more desirable to our customers, we would be using it now."

Brass has many desirable characteristics. Here are five of them that are important in Lincoln valves and fittings: 1, corrosion resistance, which means no plating is required. 2, high speed precision machining for high output, lower costs. 3, sound, non-porous structure of rod and forgings. 4, smooth performance; brass holds lubricants. 5, customer satisfaction; gas range burner valves pass the cycling test of being raised to 425°F. and back to room temperature a minimum of 10,000 times without seizure, loss of free operation, or leakage.

There are many other items besides valves that can profitably make use of the fine qualities of Revere Brass. The Revere Technical Advisory Service will gladly cooperate with manufacturers on the selection of the correct brass and its fabrication. Just call the nearest Revere Sales Office; see your telephone directory. Or write direct.

**REVERE**

**COPPER AND BRASS INCORPORATED**

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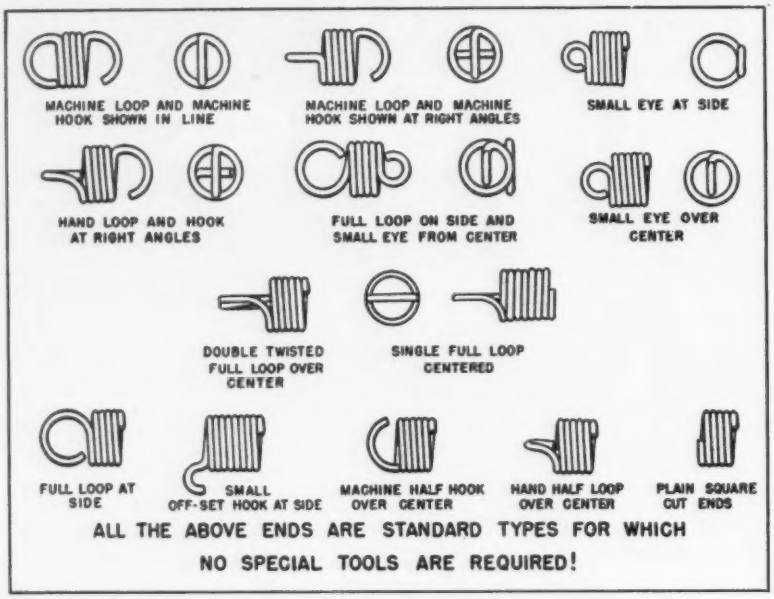
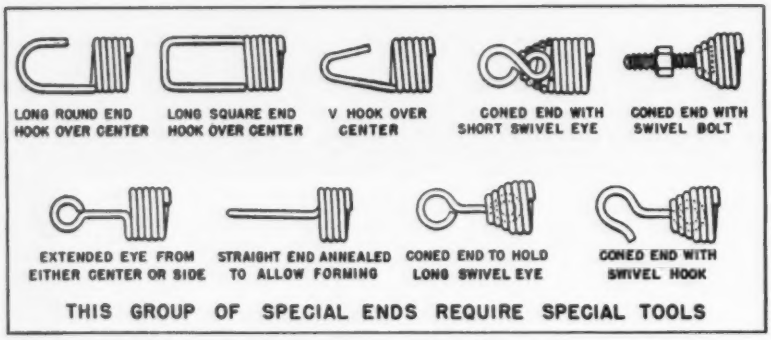
SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

## TYPES OF ENDS USED ON EXTENSION SPRINGS


MACHINE LOOP AND MACHINE HOOK SHOWN IN LINE
MACHINE LOOP AND MACHINE HOOK SHOWN AT RIGHT ANGLES
SMALL EYE AT SIDE
HAND LOOP AND HOOK AT RIGHT ANGLES
FULL LOOP ON SIDE AND SMALL EYE FROM CENTER
SMALL EYE OVER CENTER
DOUBLE TWISTED FULL LOOP OVER CENTER
SINGLE FULL LOOP CENTERED
FULL LOOP AT SIDE
SMALL OFF-SET HOOK AT SIDE
MACHINE HALF HOOK OVER CENTER
HAND HALF LOOP OVER CENTER
PLAIN SQUARE CUT ENDS
ALL THE ABOVE ENDS ARE STANDARD TYPES FOR WHICH
NO SPECIAL TOOLS ARE REQUIRED!


LONG ROUND END HOOK OVER CENTER
LONG SQUARE END HOOK OVER CENTER
V HOOK OVER CENTER
CONED END WITH SHORT SWIVEL EYE
CONED END WITH SWIVEL BOLT
EXTENDED EYE FROM EITHER CENTER OR SIDE
STRAIGHT END ANNEALED TO ALLOW FORMING
CONED END TO HOLD LONG SWIVEL EYE
CONED END WITH SWIVEL HOOK
THIS GROUP OF SPECIAL ENDS REQUIRE SPECIAL TOOLS

*Continued from page 44*

and still allow it to perform all functions satisfactorily.

In conclusion, the values given in the tables herewith represent the tolerances that can be expected with commercial springs. Closer tolerances *can* be held, but at added cost. Wherever possible unimportant dimensions should be left "open" to aid the springmaker in obtaining the required characteristics at minimum cost.

### SPRING WIRE DIAMETER TOLERANCES

(Plus or minus in Inches)

| Wire Diameter Inches | Music | Oil Tempered MB | Hard Drawn MB | Valve Spring | Chrome Vanadium |
|---|---|---|---|---|---|
| .026 and smaller | 0.0003 | | | | |
| .020 — .027 | | 0.00075 | | | 0.00075 |
| .027 — .063 | 0.0005 | | | | 0.00075 |
| .028 — .075 | | 0.001 | 0.001 | | |
| .064 — .075 | 0.001 | | | | 0.001 |
| .076 — .092 | 0.001 | 0.002 | 0.002 | | 0.001 |
| .093 — .148 | 0.001 | 0.002 | 0.002 | 0.001 | 0.001 |
| .149 — .177 | 0.001 | 0.002 | 0.002 | 0.0015 | 0.0015 |
| .178 — .250 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 |
| .251 — .375 | | 0.002 | 0.002 | | 0.002 |
| .376 and larger | | 0.003 | 0.003 | | 0.003 |

NOTE: Wire diameters should always be specified in decimals even though gauge number is also given. This will avoid misunderstanding due to the many gauges in use.

Music wire is drawn to the AISI Music wire gauge. All other carbon and alloy steel wires are drawn to the Washburn & Moen (W & M) gauge. Brass, phosphor bronze and other copper base spring wires are drawn to the Brown & Sharpe (B & S) gauge. All types are drawn to intermediate sizes particularly in the smaller diameters.

### VARIATIONS IN NUMBER OF COILS

| Number of Coils | Open Wound | Close Wound |
|---|---|---|
| 3 | ±90° | ±30° |
| 4 — 10 | ±90° | ±45° |
| Each additional 10 coils | Add ±30° | Add ±15° |

(NOTE: 1 coil equals 360°)

### COIL DIAMETER

Tolerance plus or minus

| Coil Diameter | Spring Index of 4 to 10 | Spring Index of 11 to 20 |
|---|---|---|
| 1/16 and smaller | .004 | .005 |
| Over 1/16 to 1/4 | .007 | .009 |
| Over 1/4 to 1/2 | .010 | .013 |
| Over 1/2 to 1 | .020 | .025 |
| Over 1 to 2 | .030 | .038 |
| Over 2 to 4 | .050 | .062 |
| Over 4 to 7 | .090 | .110 |
| Over 7 to 12 | .125 | .160 |

NOTE: Spring Index is mean coil diameter divided by wire diameter.

| Free Length | Open Coiled Springs Tolerance ± | Close-Coiled Springs Tolerance ± |
|---|---|---|
| 1/2" and smaller | .025 | .016 |
| Over 1/2" to 1" | .050 | .030 |
| Over 1" to 2" | .080 | .040 |
| Over 2" to 4" | .110 | .050 |
| Over 4" to 8" | .150 | .075 |
| Over 8" to 16" | .190 | .130 |
| Over 16" to 25" | .350 | .200 |

NOTES:

(1) Above values apply to springs with index of 4 to 10. For larger indexes multiply tolerance shown by actual index divided by 10.

(2) Tolerances for extension springs are for distance inside to inside of hooks.

### SQUARENESS OF ENDS— GROUND COMPRESSION SPRINGS

D = Mean diameter of coil
d = Wire diameter
L = Length

| Dimensional Factor $\frac{D^2}{dL}$ | Squareness of Ends in Free Position (Degrees) |
|---|---|
| .5 | 1.6 |
| 1.0 | 1.8 |
| 2.0 | 2.1 |
| 3.0 | 2.3 |
| 4.0 | 2.4 |
| 5.0 | 2.5 |
| 7.0 | 2.6 |
| 10.0 | 2.8 |
| 15.0 | 3.0 |

This table covers squareness in free position, and is based on dividing the ratio of mean diameter to wire size (D/d) by the "slenderness ratio," or (L/D). This result is $D^2/dL$, which determines the degree of squareness which can be maintained.

**LOAD AND RATE**

| No. of Active Coils | Load Tolerance ± | Rate Tolerance ± |
|---|---|---|
| Less than 3 | 15% | 10% |
| 3 to 9 | 10% | 8% |
| 9 to 15 | 8% | 6% |
| 15 and up | 7% | 5% |

NOTE:

(1) Rate per inch should be tested between not less than 10% and not more than 85% of total deflection. This is because end coil effects cause the rate in the first 10% of deflection to be below the actual average rate and past 85% deflection the rate becomes higher than the average due to the premature closing of one or more coils as solid height is approached.

(2) Loads should always be specified at a fixed length rather than a given deflection. This is partly because testing mechanisms are best adapted to measuring a load with tolerance at a definite height and this type of testing is, therefore, least costly. Also, the mechanism in which the spring works usually requires a load at a given *height* rather than a given *deflection*.

(3) Test lengths for extension springs should be specified as inside to inside of hooks as this is the dimension measured directly in testing and is usually the important dimension *in use* when the spring is in its assembly.

An examination of the effect of dimensional tolerances on load will illustrate the reason load tolerance should be kept as large as possible consistent with successful operation of the spring. As an example, let us use a compression spring of the following dimensions:

Wire: .0625 dia. Oil Tempered Wire
Mean Coil Diameter: .625
Number Active Coils: 5
Free Length: 1"

We will determine load at ½" height by means of the standard formula:

$$P = a\frac{Gd^4}{8D^3N}$$

where

a = deflection from free length = ½"
G = torsional modulus of material (11,500,000 for Carbon Steel)
d = wire diameter = .0625
D = mean coil diameter = .625
N = number of active coils = 5

Now referring to the tolerance tables we find the following "commercial" variations:

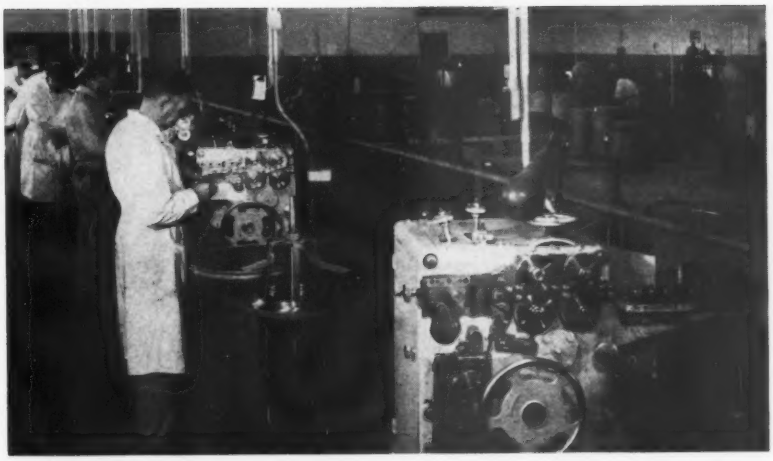
(1) Wire diameter = .0625 = .001
High limit = .0635
Low limit = .0615

(2) Coil Diameter = .625 = .020
High limit = .645
Low limit = .605

(3) No. active coils = 5 = .025
High limit = 5.25
Low limit = 4.75

(4) Free Length = 1.00 = .050
High limit = 1.05
Low limit = .95

Therefore, deflection "a" to reach ½" height actually varies from .55 to .45.



**AUTOMATIC SPRING COILING MACHINES** at Connor Spring's Los Angeles plant. These machines are of the type generally used in the manufacture of precision springs. Each machine's capacity is about 10,000 springs per hour, depending upon size and desired degree of accuracy.

Assuming the torsional modulus is constant and combining tolerances above to get the highest and lowest loads we find:

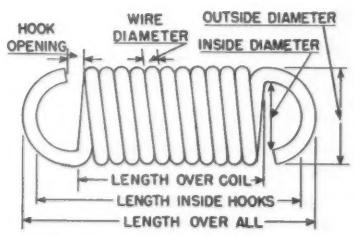
$$P\ high = .55 \times \frac{11.5 \times 10^6 (.0635)^4}{8 (.605)^3 \times 4.75} = 12.25\ lbs.$$

$$P\ low = .45 \times \frac{11.5 \times 10^6 (.0615)^4}{8 (.645)^3 \times 5.5} = 6.57\ lbs.$$

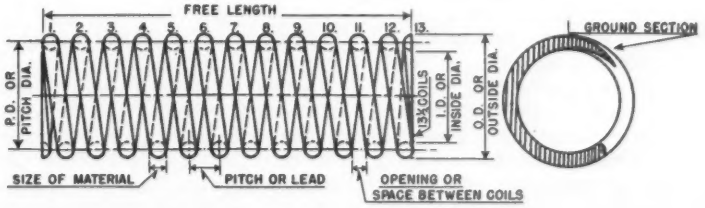
This gives us a median load of 9.41 pounds with a variation of ±2.84 pounds or ±30%. From this it can be seen that using the dimensional tolerances obtainable in commercially run springs it is possible, with all dimensions combining in the "wrong" direction, to get a load variation much higher than shown as commercial. It would of course take an unusual set of circumstances to produce variations as illustrated, but it should illustrate the number of variables which are constantly acting upon the spring to produce its final action.

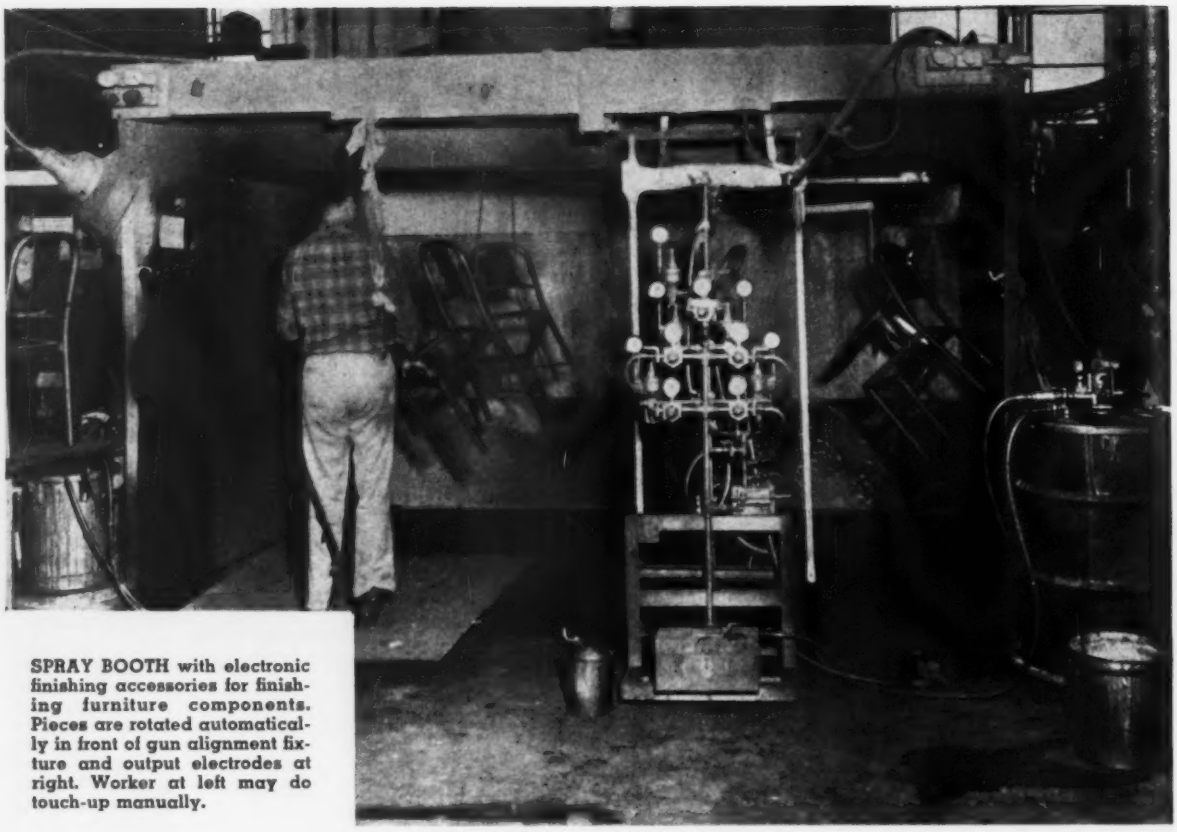
**CHARLES O'HARA**
Assistant Manager at the San Francisco plant of Connor Spring Mfg. Co. and author of this series

**EXTENSION SPRINGS**




**COMPRESSION SPRINGS**


FREE LENGTH
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.
GROUND SECTION
P.D. OR PITCH DIA.
I.D. OR INSIDE DIA.
O.D. OR OUTSIDE DIA.
SIZE OF MATERIAL
PITCH OR LEAD
OPENING OR SPACE BETWEEN COILS



**SPRAY BOOTH** with electronic finishing accessories for finishing furniture components. Pieces are rotated automatically in front of gun alignment fixture and output electrodes at right. Worker at left may do touch-up manually.

# ELECTRONIC FINISHING PROCESS

## *reduces rejects, minimizes material consumption*

AN ELECTRONIC finishing process recently introduced by Baron Industries at Los Angeles facilitates the automatic application of organic and inorganic coatings to a variety of products in large or small quantities at an unprecedentedly low cost.

Savings in terms of coating materials have ranged from about 30% to 70%, and rejects due to defective finishes have been reduced by a margin averaging 10% over a long period of time. Labor requirements were about the same as could be expected in conventional electrostatic finishing operations where a single coating station was utilized, but in several instances both labor and power costs were reduced by sizable margins by using a single power pack to energize electrodes and related facilities at two or more coating stations.

In principle, it is an electrostatic process involving the ionization of atomized coating particles in a high-voltage field, so that the particles will be electrically attracted to the surfaces of conveyor-grounded products. However, it can be distinguished from older electrostatic finishing techniques in many respects.

First of all, it necessitates the use of a full-wave electronic rectifier instead of the usual half-wave rectifier. This eliminates the need for a special factory power line, since power for the rectifier can be obtained via a plug-in attachment from any 110-volt alternating circuit, and makes it possible to charge output electrodes with 50,000 to 100,000 volts of direct current without the power pulsations that would normally cause some coating particles to be uncharged.

Secondly, its output electrodes are metal tubes with projecting points rather than the usual ionizing wires. This is said to prevent the erratic discharge of output current due to depositions of foreign matter, burrs, etc., since the electrode points are precision-machined and used so that they will not readily accumulate surface contaminants.

Further, the arrangement of pneumatic spray guns can be such that the output of coating particles is perpendicular to the surfaces of conveyor-borne products, whereas the conventional electrostatic finishing setup requires the spraying of materials at a fairly sharp angle toward products moving away from the guns.

Perpendicular spraying minimizes the distance separating a gun nozzle and a product surface, thus eliminating the need for large quantities of thinner to maintain the wetness of sprayed particles, and prevents the loss of coating materials due to turbulent exhaust currents and other dispersive forces.

Also, it is interesting to note that the new process can be used in con-

. . . concluded on page 50

# Biggest hotel built anywhere in 20 years

Architect's sketch of new Hotel Statler, Los Angeles, Calif. The Koppers Roof will be bonded for 20 years.

Architects and Engineers: *Holabird & Root & Burgee, Chicago, Ill.* Associate Architect: *William B. Tabler.*

General Contractor: *Robert E. McKee, General Contractor, Inc., Glendale, Calif.*

Roofing Contractor: *Associated Roof Co., Los Angeles, Calif.*

● With 1,275 guest rooms, the new 13-story Hotel Statler, recently completed in downtown Los Angeles, is the biggest hotel built *anywhere* in the past 20 years. Truly a showplace, too, with promenade decks, tropical planting, sun decks, airing porches, and a swimming pool in the patio.

Built-up roofing protects this ultra-modern hotel and Koppers Roofing Materials were used exclusively. A wise choice, because roofs built up with Koppers Coal Tar Pitch and Approved Tarred Felt resist prolonged contact with water *without deteriorating,* and are actually self-sealing if small breaks occur.

As for long life, a Koppers Bond *guarantees* the performance of the roofing materials on this roof for 20 years. Your roof can have the same guarantee—for 10, 15, or 20 years if it is applied by an Approved Roofer according to Koppers specifications.

Koppers Roofing Materials are available throughout the United States, including the West Coast. Specify Koppers Roofing Materials, and your projects will have the best in built-up roofing. Get in touch with us for complete information and specifications.

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**KOPPERS COMPANY, INC., Pittsburgh 19, Pa.**

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• SPECIFY KOPPERS FOR LONG-LIFE ROOFING •

## ELECTRONIC FINISHING

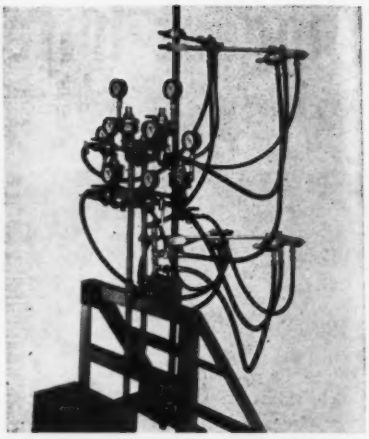
. . . Continued from page 48

nection with standard spray booths, conveyors, compressors, ventilation facilities, etc., without a loss of efficiency and without creating a fire or accident hazard.

The number of spray guns for a given finishing operation depends on the size and complexity of the product to be coated. Guns are mounted, as convenient, on numerous types of easily constructed alignment fixtures; and, if the products on a conveyor are widely spaced, they are periodically actuated by a trigger mechanism so that no coating materials will be sprayed when there are no deposition surfaces in front of the gun nozzles.

Turn-around accessories on the conveyor are usually sufficient to make all deposition areas accessible to the output of the fixture-mounted spray guns; but, where this has been impractical, a manual gun operator, working in the same booth as the electronic finishing equipment, has been able to accomplish essential touch-up work prior to the drying of the finished products.

Any shock that might be received by a worker in the latter circumstances would be no more disastrous than the jolt received by a man who touches a metal surface after sliding across the seat of an automobile, since the high-voltage current used in charging sprayed coating particles has very little amperage.



**TYPICAL FIXTURE used in mounting spray guns for new process. Separate valves and gages are used to regulate output of respective spray units for different finishing operations.**

However, enough sparks could be produced by an accidental short circuit to cause a fire if the electronic power pack were not safetied with a vacuum-tube valve which automatically halts all finishing operations whenever there is an abnormal surge of current—a sure indication of trouble—in the high-voltage circuit.

Aside from its inherent economic virtues, the new finishing process has the advantage of being adaptable to numerous types of production operations. The portably-housed power pack can be situated in any convenient location—in, near, or some distance away from the spray booth. The arrangement and spacing of output electrodes can be varied in many ways without loss of time or expenditure of money for new equipment. And, as previously noted, numerous gun-alignment fixtures can be easily devised in accordance with the deposition areas and quantities of coating materials required to finish different products in specified periods of time.

Products that have to date been coated by means of the new process include steel pails, blitz cans, metal chair frames, automatic washer and dryer housings, steel cabinets, etc. Finishing materials included ceramic slips, thermosetting enamels, lacquers, oil paints, and water emulsions.

If necessary, the latter materials could have been preheated or sprayed with steam pressure—although no work of this type is yet known to have been done on a substantial production basis.


how NORGREN lubricates an air cylinder with less than 1 cfm of air

**Cylinder counterbalances "side head" of car wheel borer made by *Niles Tool Works of the Baldwin-Lima-Hamilton Corp.***

**PROBLEM**

To obtain dependable oil fog lubrication of air cylinder through ¾" pipe with less than 1 cfm air flow (insufficient to operate any ¾" lubricator).

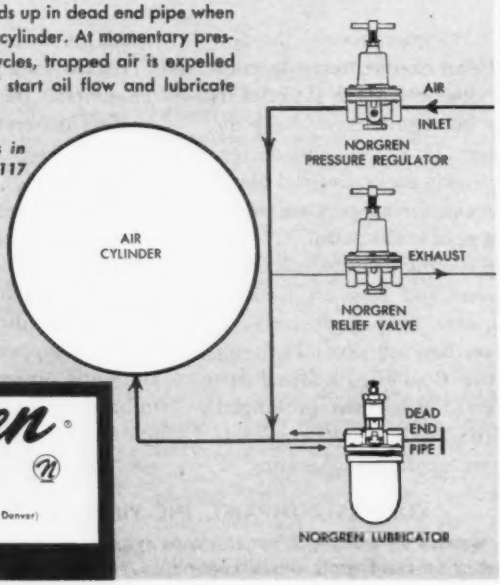
**SOLUTION**

Use of Norgren Oil Fog Lubricator on a dead end pipe.

**RESULT**

Air volume builds up in dead end pipe when air flows to and from cylinder. At momentary pressure drop between cycles, trapped air is expelled with sufficient cfm to start oil flow and lubricate cylinder.

*Write for the details in Norgren Blueprint No. 117*




- VALVES
- FILTERS
- REGULATORS
- LUBRICATORS
- HOSE ASSEMBLIES

Norgren

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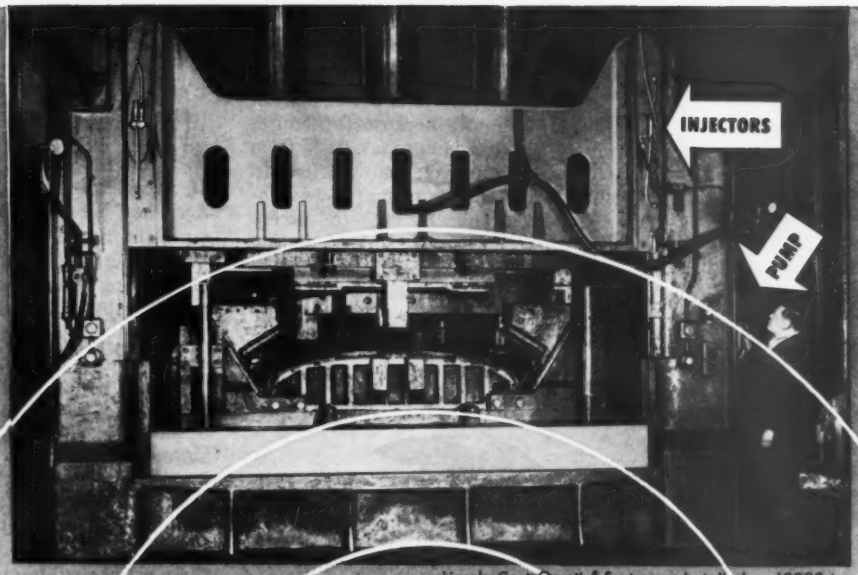
IN COLORFUL COLORADO




Lincoln CentrOmatic* System as installed on 10000-ton Hydraulic Press at Michigan Bumper Corp.

**"APPLYING THE RIGHT LUBRICANT, IN THE RIGHT QUANTITY AT THE RIGHT TIME WITH**

# Lincoln CENTRALIZED LUBRICATION SYSTEMS

**SAVES PRODUCTION TIME... LOWERS MAINTENANCE COSTS"**

C. R. Housdorfer, Vice Pres.
Michigan Bumper Corp., Grand Rapids, Michigan

"We have been very pleased with our two Lincoln CentrOmatic Lubricating Systems as recently installed on our 525-ton Cleveland Mechanical press and our 1000-ton Lake Erie Engineering Corporation Hydraulic press.

"Applying the right lubricant in the right quantity at the right time has saved us considerable production time due to eliminating down-time for lubrication of ram and cushion ways. Lack of lubrication at these strategic points results in costly repairs and delays, especially in these times of shortages—as these ways are bronze. Savings in replacement and maintenance costs are naturally reduced in direct proportion.

"We expect to equip our other presses with Lincoln Centralized Lubricating Systems as soon as conditions permit."

C. R. Housdorfer, Vice Pres.
Michigan Bumper Corp., Grand Rapids, Michigan

525-ton Cleveland Press equipped with Lincoln CentrOmatic System.

Distributed Nationally Through Leading Industrial Distributors Located in All Principal Cities

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LUBRICATING EQUIPMENT • • •

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Lincoln's Lubrication System specialists will work with you and recommend the time and money-saving Centralized Lubrication System best suited to your equipment.

Write for your copy of catalog 80 giving complete information on Lincoln's Centralized Lubricating Systems.

*Trade Name Registered

## MATERIALS HANDLING becomes the function of traffic managers

IN SOME SPOTS, the traffic managers have more or less turned into materials handling engineers, previously the exclusive function . . . of manufacturing, according to Western Trucking News Service.

"Here is the background: Most plant men seem to feel that from now on about the only plant economy left is the savings that can be made from mechanized handling of materials, inbound, inside and outbound.

"Traffic managers were pushed into this situation in several places against their will simply because procedures had to be worked out to take stuff from trucks fast and avoid waiting time. In several places, plant materials handling deals were OK with the exception that it didn't work well getting the stuff into the plant or out of it, and this largely knocked out any economies that were made inside. The traffic manager, against his will, was jerked into the picture.

"In one place, the traffic manager has worked out an overhead carrier set-up that virtually spots stuff in the trucks and cars. The final check-out is made on the manufacturing line. Routing instructions are attached almost at the same time as the final packaging. In another situation, the traffic manager has been hauled into the deal since the use of bulk carriers has entirely altered the in-plant procedures and getting the stuff inside is his particular baby.

### Also Replacing "Ad Boys"

"In still another place, the traffic manager has been handed the job of developing new packages for the line since the bright ideas of the advertising department haven't worked out too well in practice. The ad boys got outstanding packages all right, but the soaring damage claims indicated that there was something to be done before the job was satisfactorily completed.

"To save face (which, by the way, is very important in corporations these days), about the only thing to be done was to haul in some guy who hadn't been connected to the project to date, and let him work it out. Although the traffic manager tried to duck, the situation is on his desk, and the traffic manager knows he will have to work it out."

## ALBERTA BUSINESS looks to Los Angeles

"ALBERTA business men all told me that they like buying from Los Angeles firms as opposed to eastern Canadian and eastern American firms" reported J. Wade Dunaway, world trade commissioner for the Los Angeles Chamber of Commerce, after a recent visit to western Canada.

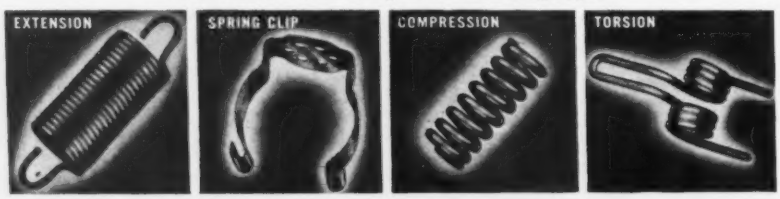
### There's a Reason

"First, because Los Angeles business firms don't treat them like poor relations living in the sticks by sending up last year's line, damaged goods and all those things that eastern American manufacturers used to do to us on the West Coast before we grew up.

"Alberta business men tell me that the freight rate on trucked goods is favorable and comparable with other means of transport when the goods are brought up through Salt Lake City and enter Canada at the border town of Coutts, Alberta. On the other hand, if the goods are trucked up the Coast and over the Canadian Rockies or over the mountains in Washington State, the freight costs are prohibitive."

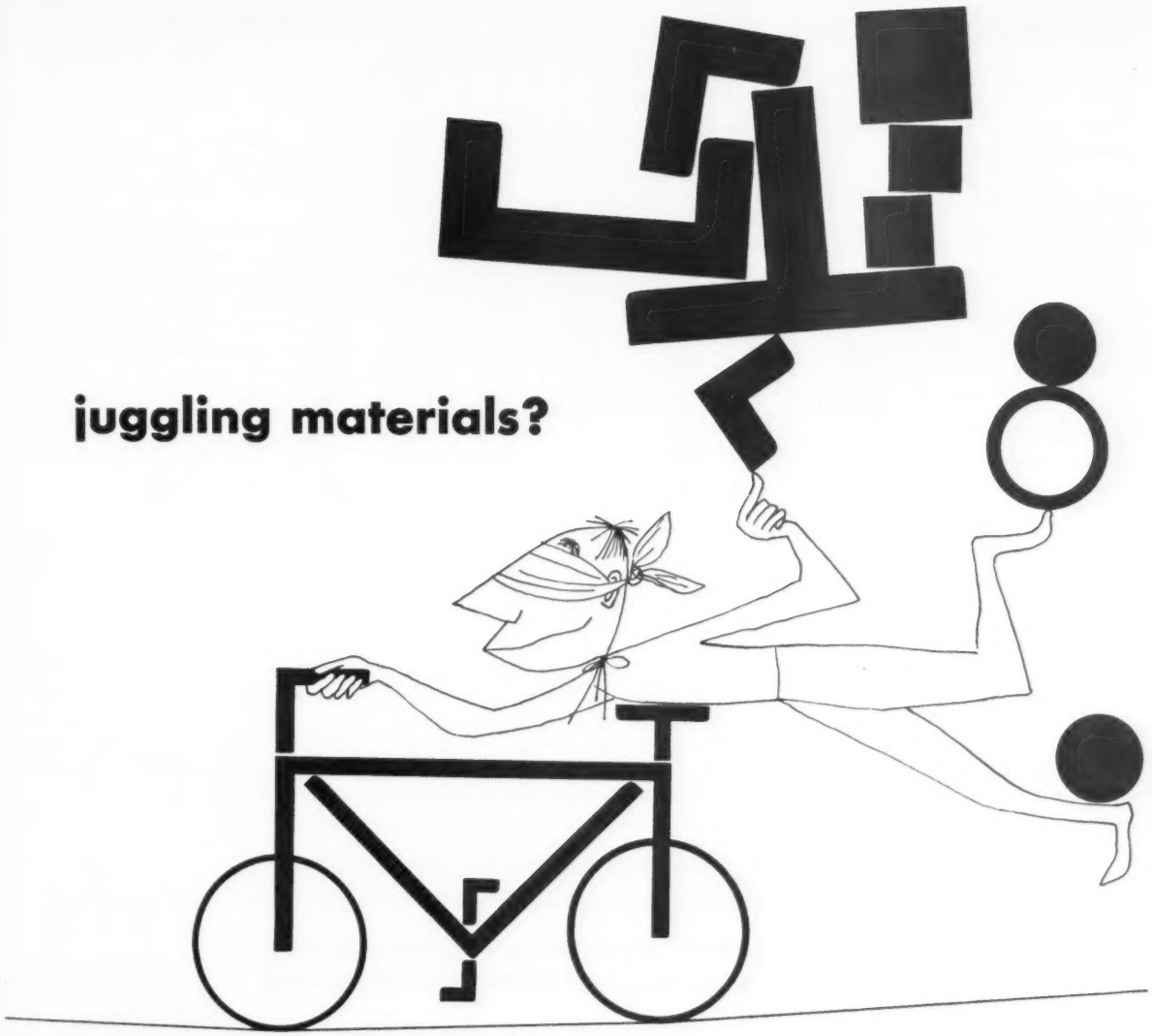
**Heavenly bodies**... It takes a king-size telescope to probe the heavenly bodies that lie zillions of miles away from the Palomar Observatory in Southern California. And king-size springs to cradle the world's largest star-gazing installation. So the super-scientists naturally turned to California for super-springs—best in the west since '23. All sizes, all types, all wires.

*We Stock the West's Largest Selection of Springs*




*When it's spring-time call* **California Spring**
COMPANY • INCORPORATED
*Spring Headquarters of the West since 1923*

1746 S. LOS ANGELES STREET • LOS ANGELES 15, CALIF. • PHONE Richmond 6221

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## FAST ENGINE TESTING

***Two self-propelled units at Oakland airport save 3,800 man hours yearly and eliminate undesirable noise***

OAKLAND Aircraft Engine Service has developed and now operates at Oakland Municipal Airport two new self-propelled mobile engine testing units that will save over 3,800 man hours yearly and eliminates the noise factor at airports equipped with engine repair facilities.

These mobile units have proven so successful in the early stages of their trial that it is believed they may cause a radical change in the operational procedures of engine repair systems.

Their mobility and self-sustainability provide many advantages in cutting time and methods of operation. At the same time, they are still far less expensive to construct than the conventional fixed test cell. The two units now going plus a third to be in operation soon will cost a total $25,000 —considerably less than the minimum cost of a fixed cell which must be housed. In addition, cost of a flat bed truck to transfer the engines from repair shops to test unit and back again is elminated by the mobile units.

Assembled on cut-down surplus military buses, the units are equipped with the latest instrumentation for accurately checking engine performance. They carry their own fuel load, can be driven on the highway for work at any point accessible by ordinary vehicles, and, with quick-change fittings, a complete engine change can be made in only 45 minutes.

By being able to move away from the congested area of an airport, the units can operate 24 hours a day without disturbing workers with the noise of the big engines being tested. At the same time, mobility makes it possible for the engines to face into the wind at all times, an advantage to accurate testing.

Units are constructed so that they are readily adaptable to different size engines of all types and can be developed to absorb any horsepower available in the reciprocating engine field.

Although these mobile testers were not designed with the intention of military use, their wheels could be easily replaced by half or full tracks similar to those used in weapon carriers or tanks, giving them the ability to operate in rough terrain.

### MAN MAKES GOOD

JOHN C. KNOCH of 2875 N. 10th St., North Sacramento, is awarded $150.48 by McClellan Air Force Base for his suggestion of a rocker arm end clearance gauge for checking engines overhauled at the Base, Sacramento, Calif.

Before Knoch developed this device there was no way of checking rocker arm interference until the rocker arm was installed in the cylinder. Now, with the new gauge, all cylinders are checked and reworked prior to installation on an engine.

McClellan Air Force Base is now using six of these gauges, saving about $5,040 each year.

### BOY MAKES GOOD

HARVEY HEFLEY, 17, son of a machinist employed in Santa Fe Railway's shops at San Bernardino, is the winner of an all-expense four-year scholarship to Allegheny (Pa.) College awarded by the railroad. He graduated from San Bernardino high school in June of this year, majoring in mathematics and science. Besides graduating with honors in the upper quarter of a class of 727 students, Hefley has a fine activity record.

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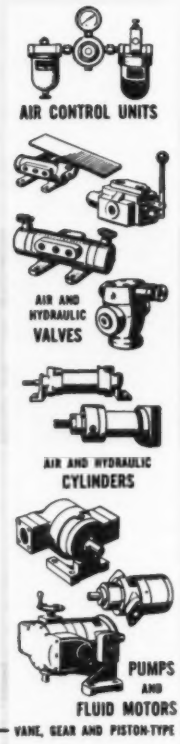


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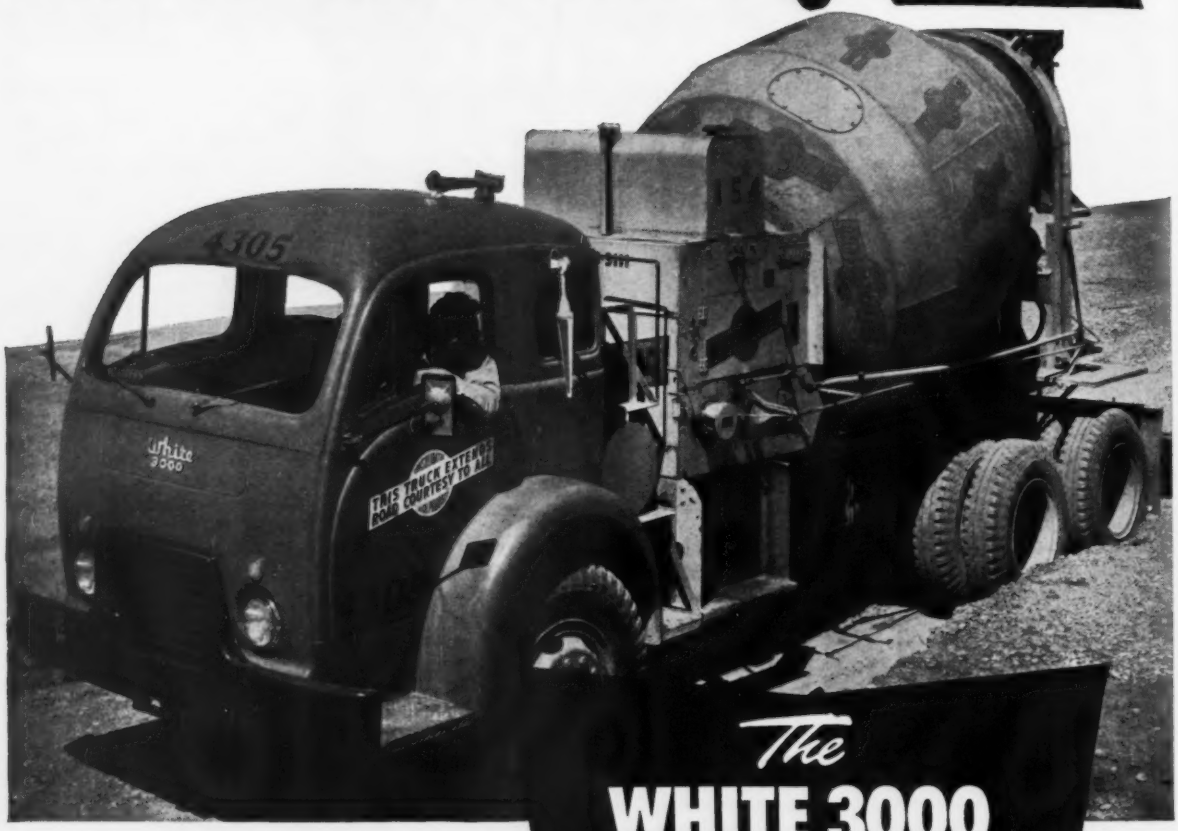


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## the water supply 46 times in a steel production mill

By
HARRY I. RIEGEL
Superintendent,
Utilities Department
Kaiser Steel
Corporation
Fontana, Calif.

WASTE DISPOSAL and water conservation are so closely related that it is impossible to segregate one from the other. To reduce or eliminate water pollution is to make this recovered water available for further use. By so doing, the need for fresh supply is reduced, thereby conserving one of our greatest material resources.

The waste disposal problem at the Fontana plant of Kaiser Steel Corporation is so clearly tied in with our general water problem that it is impossible to discuss one without including the other.

Ours is probably the only fully integrated steel plant not located at or near a river, ocean or lake to supply the required large volume of water for the steelmaking processes; nor on a river or outfall to dispose of used water. This plant, therefore, is faced with a water problem which few other steel mill operators worry about.

### 1,400 gal. per ton

At Fontana, we recirculate approximately 50,000 gals. of water for every ton of steel shipped out. This recirculation requires approximately 2½% makeup, or 1,400 gals. of actual consumption per ton of steel produced. The national average for other mills is approximately 65,000 gals. per ton of steel shipped.

Since most other mills have little or no recirculation, this makes their actual consumption 65,000 gals. per ton, compared to the Fontana plant consumption of 1,400 gals. per ton.

Some of the details of procedure may be applicable to other plants. Variables will be the quality of water as received, nature of the processes and their effect on the quality of water, and finally the requirements for effluent quality.

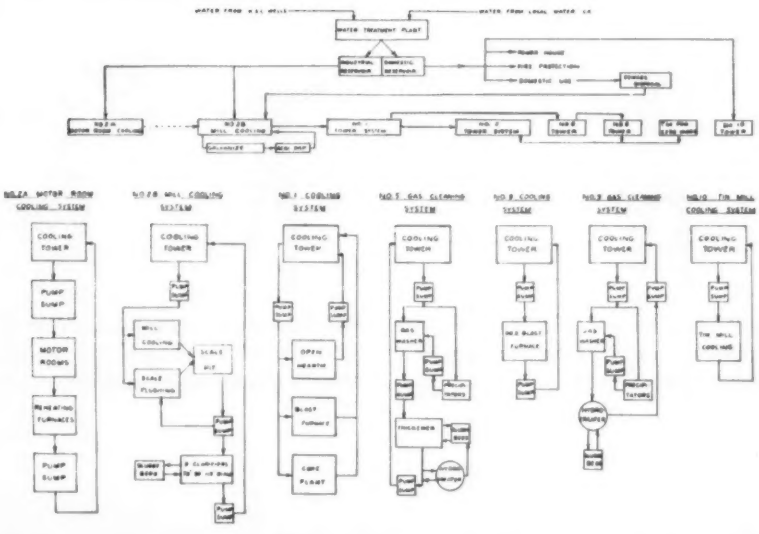
We purchase water from a local water company, which is essentially a supplier of irrigation water. This is raw untreated water which the water company receives from Lytle Creek, from wells in the Lytle Creek basin, and from wells in the Chino basin. Lytle Creek normally supplies a large percentage of the water company's requirements during the late winter and early spring months, but becomes grossly inadequate during the remainder of the year, so the water company supplements the creek flow with well water. The steel plant also has two wells on the plant property which are used to supplement the outside source of water. The water level is approximately 350 ft. below the ground surface.

### Part of Plant Design

Many of our problems were overcome by recognizing them before the plant was built and incorporating con-

. . . continued on page 62

### "SCHEMATIC" OF FONTANA'S WATER SYSTEM



***Fontana uses 1,400 gal. per ton, as compared to competing mill consumption of 65,000 gal. per ton. Fontana's problem is unique; so is their solution, explained in this article.***

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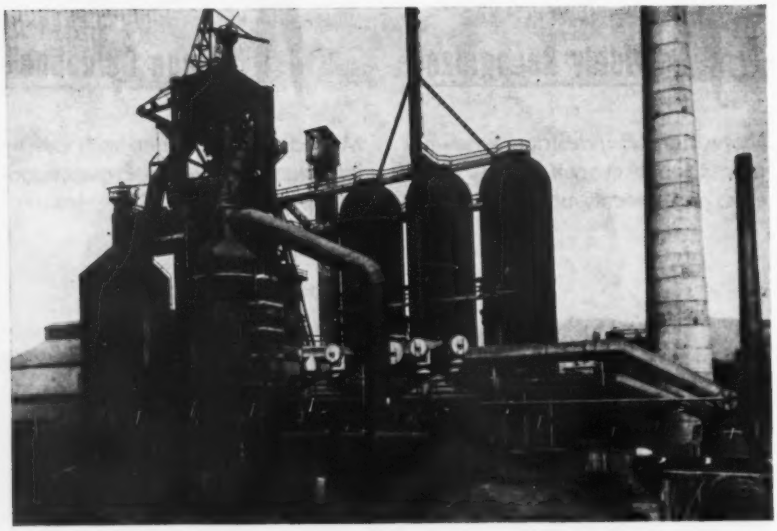
**2-B COOLING TOWER shown at the left, with three clarifiers in the center, where suspended solids are skimmed from the water and lubricating oil skimmed from surface.**

**ANOTHER COOLING TOWER, with clarifier in the foreground. Part of clarified water is used for cooling, the rest joins with cooling tower effluent for the main mill supply.**



**WASHING SYSTEM in the foreground, with blast furnace behind. Washing removes dirt from blast furnace gas, but water then passes through a thickener and hydotreater.**

# STRETCHING WATER SUPPLY

. . . continued from page 59

servation measures in the basic design, while others were handled in plant operations as soon as they were recognized as being important. This required changes of design, changes in operation, and involved experiments on unproven theories. The measures taken, combined with a plant-wide educational program, have resulted in low water consumption and excellent control of industrial wastes.

Every operation is carried on in such a manner as to conserve water and control the pollution problem. Some of these operations may appear trivial but they are all part of the over-all plan.

### First Treatment

Raw water enters the water treatment plant where it is treated in a 50-ft. diameter hydrotreator with pebble lime and soda aluminate. Sludge is continuously recirculated to aid in the reduction of solids.

Then the water passes to a carbonation basin where the resultants of combustion are bubbled through the water to control the pH. Next, it passes through a rapid sand filter to the covered domestic water reservoir. We attempt to remove solids rather than change the salts for softening only.

The domestic water reservoir normally overflows into the industrial reservoir. Occasionally water from the hydrotreator passes directly to the industrial reservoir without the benefit of passing through the sand filters. We prefer to pass all water through the sand filters but emergency conditions sometimes prevent us from doing it.

Sand filters are backwashed once daily under normal conditions. The backwash water is delivered to a reclamation basin where the solids are allowed to settle out for four to six hours. The solids, as sludge, are delivered to a sludge bed and the water returned to the system in the carbonation basin for use.

### Domestic System

The domestic water system consists of pumps in the domestic reservoir which delivers water into the domestic mains with a 250,000-gal. tower. The domestic mains form a network to supply water for fire protection, water for human consumption and sanitary purposes.

This network also supplies water for lawn and shrubbery irrigating around buildings. It is not used for the general

. . . continued on page 64

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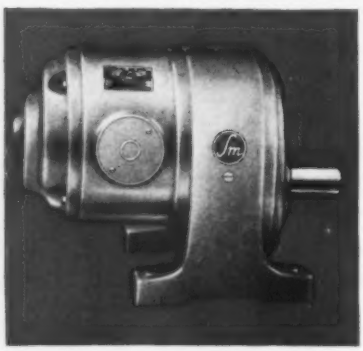

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## STRETCHING WATER SUPPLY

. . . continued from page 62

agricultural enterprises conducted on some 700 acres of the plant property, which use raw water as purchased and supplied through a separate irrigation line.

The industrial reservoir supplies the industrial consumers through a separate system. Our normal procedure is to make up water into our 2A system, blow down into the 2B system and from 2B system to No. 1 tower, and finally into blast furnace gas washing system. The blow-down from this system supplies our slag pits with the necessary water to cool the slag sufficiently to be handled by mechanical equipment for removal to the slag dump. The blow-down of one system is the supply for the next system.

### Cooling Tower System

Our 2A cooling tower system consists of cooling towers and pumps; the cooling tower capacity is 15,000 gals. per minute. This water is pumped to our motor rooms for cooling the motor rooms and the electrical equipment, including the 5,000-hp. motors.

After passing through the motor rooms, the water passes through the water-cooled skids of the reheating furnaces and then discharges into a pump sump. The water is then pumped over the cooling towers to start another cycle. Threshold amounts of phosphate are used to control scale conditions in this system.

Our 2B system consists of one natural draft cooling tower with necessary pumps. It supplies water for cooling the bearings and rolls of the various rolling mills. At the mills, some of the water is recirculated to move the scale into the scale pit where the scale may be recovered to be reintroduced into the metallurgical process for recovery.

The heat load on this system is low, but the volume of water used is very high. As this water carries considerable suspended solids and some lubricating oil, we have installed three clarifiers to settle the solids from the water and also skim the oil. They are 70 ft., 90 ft., and 115 ft. in diameter.

Water returned from the mills passes through these clarifiers in parallel into a pump sump where part of the water is pumped over the tower for cooling. The remainder passes over the overflow to combine with effluent of the cooling tower to supply the main pump house with the necessary water to supply the mills.

This system also has a traveling screen to remove leaves and other material that may be blown into the cooling towers. We are equipped to add coagulants to the clarifiers but we presently are not doing so.

The No. 1 system is identical in operation to the 2A system previously mentioned in that the water passes over cooling towers to a pump sump where it is pumped into the supply lines for open hearth furnace, blast furnace, and coke plant cooling.

In most cases where practical, a number of coolers are placed in series to reduce the water requirements. We have found by so doing that our water consumption is less, our cooler losses less, and we obtain better operation of our cooling system due to the greater heat differential available.

This higher velocity also permits higher concentration of solids with less loss of coolers. In many cases, we have found it necessary to redesign coolers to increase the velocities, thereby reducing loss of coolers because of build-up. No chemical treatment is used in this system.

The gas washing system receives the blow-down of the rest of the system. It washes dirt from the blast furnace gas so the gas may be burned in furnaces without the flue gas passages becoming plugged with dirt. It also reduces dust liberated into the air with the flue gases.

### More Treatment

As this water becomes very poor after passing through the system two or three times, it is necessary to incorporate water treatment at this point. This water is heavily laden with solid materials from the dust of iron ore, coke and limestone and soluble material such as CO from the gas, calcium bicarbonate, magnesium bicarbonate, with smaller amounts of potassium and sodium compounds.

It is necessary to drop sufficient of these materials to render the water suitable for re-use and at the same time dispose of any surplus in a manner not to jeopardize the underground water stream. We have been using a Dorr thickener 90 ft. in diameter for settling the heavier solids and recently have been using a mixture of soda aluminate and alum to form a floc to further improve the cleaning.

After the water passes through the thickener, a portion of the water passes through a 50-ft. hydrotreater where the water is treated with pebble lime for reduction in solids. Some water from this system is used to cool the blast furnace slag, so mechanical equipment can handle slag for removal to the slag dump. This water requirement acts as a blow-down for the gas washing system.

### Sewage Disposal System

The sewage disposal plant is a complete two-stage biofiltration plant. The effluent of this filter is delivered to a recirculation well where part is returned to the influent well for recirculation to the primary circuit. The remainder is pumped into the secondary settling tank.

Part of the settling tank effluent is returned to the secondary filter and the remainder to the helical baffled chlorination basin, which is 30 ft. in diameter by 7 ft. deep. From it the water is pumped into the industrial water system for further use.

### Acid Disposal

Certain steel products must be treated with acid for removal of surface blemishes and defects, and the spent acid must be neutralized so that water may be recovered.

It is delivered by ceramic pipe lines to a lead-lined steel storage tank, and thence into a series of three wooden turbo mixer tanks, in the first of which pebble lime is added. The surplus effluent overflows into a 50-ft. thickener from which the sludge is pumped to sludge beds and the water sent to the chlorinator basin of the sewage disposal plant to be returned to the plant for further use.

### Quenching Tower

Moisture is liberated from the coal to the gas in the coking process, condensed out and recovered as this gas passes through the by-products recovery plant. It is unsuitable for ordinary industrial cooling without expensive treatment, and is collected into a sump where it is used for quenching of coke. The overflow is allowed to return to the pump sump for further use. As a result of this recovery operation, very little if any plant water is used for make-up.

The water in this system is evaporated in the quenching process, leaving the residue on the coke which is later charged into the blast furnace. Any objectionable material is either burned and passes out with the blast furnace gas, or is removed as part of the blast furnace slag and delivered to the slag dump. The blow-down water from the blast furnace gas washing system and the rinse water from zeolite softeners is sprayed on the molten slag and is evaporated, also leaving the solids with the slag. The solid apparently fuses with the slag as tests of the resultant blast furnace slag indicate no ill effect because of possible leaching.

A new tin-plate mill is about to be

*Concluded on page 66*


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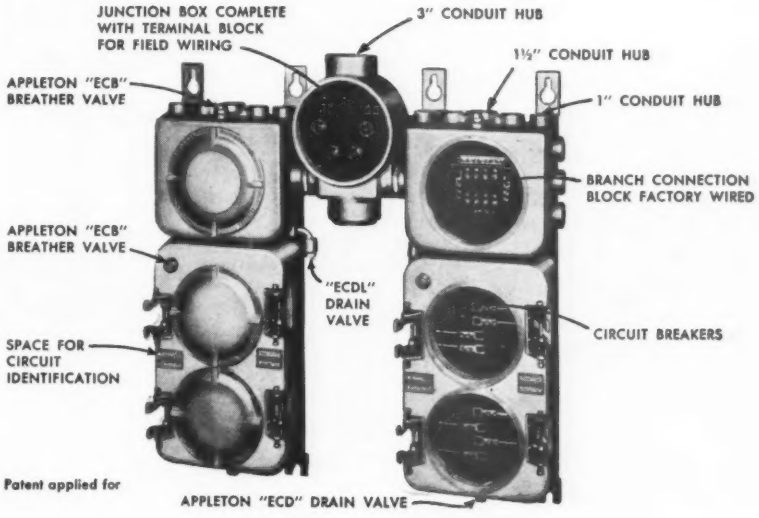


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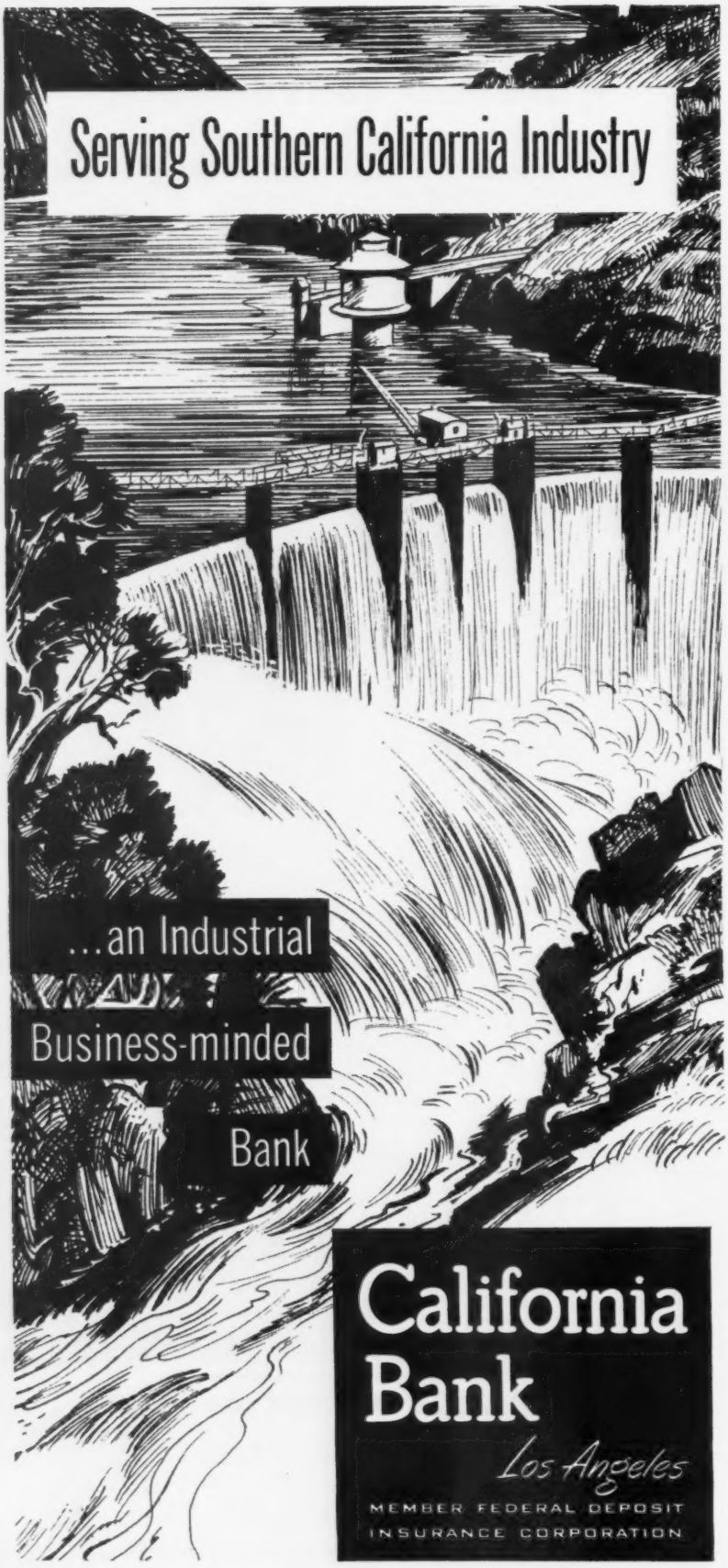
**Export Representatives:** International Standard Electric Corp., 50 Church St., New York 7, N. Y.




## STRETCHING WATER SUPPLY

. . continued from page 65

placed in operation at Fontana. This new process introduced some problems new to us. In cooperation with Kaiser engineers, a new water system was designed to take care of the problems. This system will receive water from the blast furnace gas washing system and treat it in such a manner as to make suitable water for tin mill use. This system will also treat the spent pickle liquor from the tin-plate mill operations and recover the water for further use. This system is designed to handle 600 gals. per minute of process water and recirculate 7,000 gals. per minute of cooling water. It will cost $350,000. This may sound like a heavy capital expenditure for the volume of water handled, but I must remind you that we have no place to dispose of this water and, secondly, we are forever mindful of the desire to protect our underground water reserves.

A comparison of our water department's costs with those of similar steel mills indicates that we are at a slight disadvantage. Our operating costs are necessarily higher because of multiple pumpage and chemical treatment and the capital investment is naturally greater. The system as now constituted requires six men continuously for operations. These are some of the penalties we pay because of our location. However, we do have some advantages in that our quality control generally is better and fish or rubbish do not enter our intakes to play hob with our systems.

### Control of Water Quality

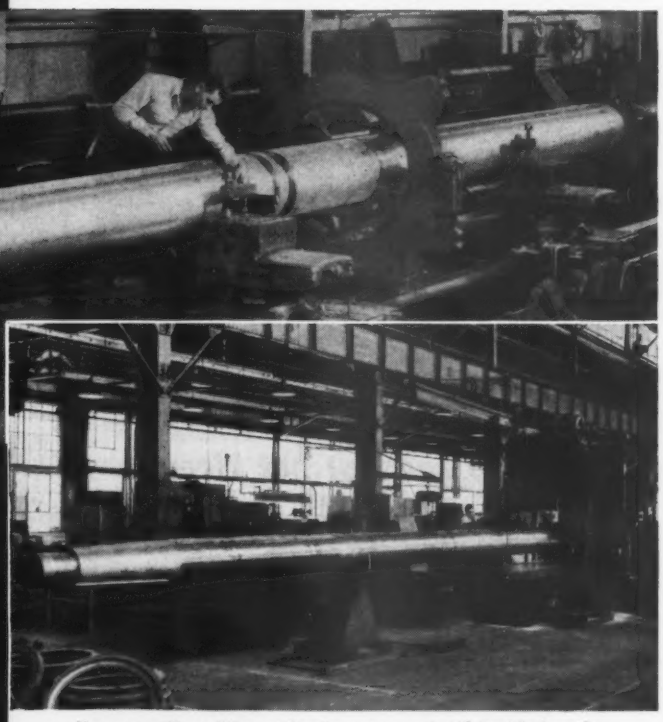
Control of water quality is maintained by tests which we have found necessary or desirable. The testing is done by the operators on a periodical basis. The time interval between tests is based on the need for control, many are hourly tests and some daily.

The record of these operating control tests gives us a guide to performance and supplies a clue to abnormal conditions which may require special attention.

In addition, weekly check tests are made by our chemical laboratory to verify the operators' results and apply supplemental data which cannot be obtained by the operators. When necessary, additional tests are made by the laboratory to provide data for special situations.

We could not expect to maintain water or pollution control without the minimum testing procedure which we have been using.

# for Twin-Screw Marine Propulsion



Keyway mill used for cutting keyways up to 16 feet in length.

Propeller shafts, forged and machined ready for installation, are typical of the precision operations performed every day at National Supply's Industrial Products Division.

This fully integrated machinery building plant of The National Supply Company serves every type of industry in the western states—steel, transportation, mining, shipbuilding, aircraft, etc.

The facilities of the Torrance Plant range all the way from melting furnace to finished product, whether forged, cast, or welded. Equipment is available for heat-treating and machining to the most precise standards and specifications.

Conveniently-located, completely-equipped, and staffed by skilled workers and technicians, the Industrial Products Division of National Supply is a logical western manufacturing source for specialized machinery requirements. When you have time for a visit we'd like to show you our plant.

**INDUSTRIAL PRODUCTS DIVISION**

**THE NATIONAL SUPPLY COMPANY**

**TORRANCE, CALIFORNIA • LOS ANGELES AREA**

IDEAL PRESSED STEEL FORGINGS • BILLETS AND LARGE BARS
STEEL CASTINGS AND SPECIAL MACHINERY
MELTING • FORGING • CASTING • MACHINING • HEAT TREATING
ASSEMBLING • WELDING • TESTING

# this wrench

# can slash your costs 3 ways

## TAC Open End Ratchet Wrench

**delivers incredible savings wherever "tight" situations prevail involving tubing, pipe, conduit, cable or long studs. Saves at least three ways:**

1. **CUTS TIME** on production or maintenance operations because it slips around tubing and down fittings, where you ratchet off or on in mere seconds. Functions perfectly with as little as 7° arc clearance for handle. Reduces workman injury too—TAC can't slip off the work and skin up knuckles.
2. **CUTS COST** on fittings, tubing, etc. Snugs down on fittings, never "barks" or scars the hex fitting.
3. **REDUCES INVENTORY OF HAND TOOLS** required in your tool crib. Several sockets, a few head sizes, and you eliminate over *half* the wrenches you'd otherwise maintain.

**"BORROW" ONE— PROVE FOR YOURSELF!**

Rated companies may request on Letterhead a sample handle, head and socket, for full trial. We ship on memo billing—returnable for full credit. ACT NOW—"BORROW" THIS MIRACLE WRENCH and prove its value!

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**TUBING APPLIANCE COMPANY**
10321 Anza Avenue, Los Angeles, California

## HERE'S AN ALUMINUM TANK TRUCK for commercial-industrial bulk uses

LOS ANGELES bottled-water customer demands, necessitating tank trucks with greater capacity, easier maneuverability and less weight, have prompted Arrowhead and Puritas Waters, Inc., to add a custom-designed aluminum tank truck to its commercial-industrial bulk delivery fleet.

Tank interior of this $11,000 truck is lined with plastic Americoat No. 33 to maintain absolute purity of the distilled water. White Liner dairy-type hose, especially developed for use with distilled water, is odorless and tasteless. The hose reel is electrically operated. A Neptune meter permits closer control of measurements to customers.

New bulk truck's outstanding feature is an auxiliary pumping unit operated independently of the truck engine. The tank truck was built by Aluminum Body Corp., and a White, model 3000, powers the unit.

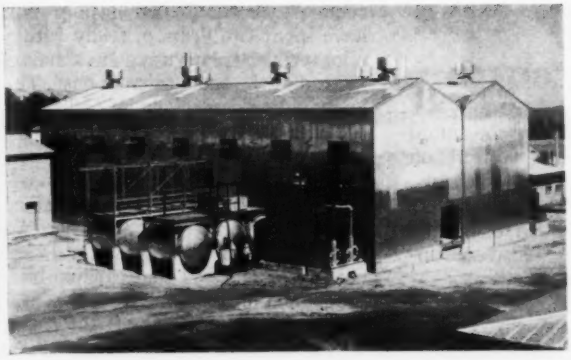
A measure of just how satisfactory these features are comes from R. S. Suttle, Arrowhead-Puritas manager, who maintains that the firm services 30% more customers per day with the new truck. Says he, "It has a 2,100-gallon capacity—900 gallons more than our previous models. That means fewer trips back to the plant for refilling. And because of its lighter weight, due to aluminum construction, plus its cab-over-engine design, the bulk truck handles easier in traffic."

## FIRM PRESIDENTS UNDER 39— group promotes individual incentive

ONE OF THE THINGS that this country needs is increased young competition—and so believing, a group called the *Young Presidents' Organization* is working toward the latter goal. Founded in 1950, and having over 375 members throughout the United States, a chief objective of YPO is "to take aggressive action in support of those principles that will further the development of individual incentive."

All members of YPO became presidents of large corporations before reaching the age of 39. They cannot be over 43 at the time of joining. They may remain active in the organization until they are 48 years old.

YPO is rapidly becoming organized in California where, in July, it counted nine members. They are: Robert O. Denny, Grand Central Aircraft Co., Glendale; Robert L. Chambers, Magna Engineering Corp., Menlo Park; Stephen G. Herrick, Herrick Iron Works, Oakland; Stanley Hiller, Jr., Hiller Helicopters, Palo Alto; George J. Morton, Drayer-Hanson, Inc., Los Angeles; Robert Q. Parsons, Century Engineers, Inc., Burbank; Louis Potomac, Alsynite Corp. of America, San Diego; John V. Vaughn, Sillers Paint & Varnish Co., Los Angeles; and Marshall I. Wais, Marwais Steel Co., Los Angeles.



## NEW TITANIUM DEVELOPMENT in operation at Boulder City, Nevada

A NEW DEVELOPMENT section of the titanium research program of the Bureau of Mines started operations at Boulder City last July as another step in the development of processes and techniques for titanium metal production aimed at making better metal at a lower cost. The new group, under direction of M. G. Mastin, will operate a large scale production and demonstration plant to supplement the laboratory and smaller-scale work of the titanium research section which will continue as in the past under direction of Frank S. Wartman. Expanded scope of the work is in cooperation with the Armed Services.

This new plant is housed in a rigid-frame steel structure sheeted and roofed with corrugated aluminum, is 72 by 107 ft. in size and 30 ft. high at the eaves. Plant equipment includes storage and a purification plant for titanium tetrachloride, a group of conventional batch reactors with accessory equipment for producing, purifying, and handling crude titanium sponge metal, and space for a number of new reactors which are in the experimental development stage.

Around 1944, the Bureau's plant, then in Boulder City, Colo., turned out 100-lb. batches of metal and produced regularly 150 lb. of processed metal weekly. By 1947 the size of the reactor had been increased to produce 200 lb. of metal per week. By 1949, production in the plant had risen to 800 lb. per week.

Late in 1950, the Bureau's pilot plant facilities were loaned to Titanium Metals Corp. for them to operate as a producing plant. This arrangement continued for over a year and resulted in the production of over 100,000 lb. of metal badly needed for the defense program. Subsequently, Titanium Metals Corp. started producing titanium metal in its own plant at Henderson, Nevada.

In spite of extensive research programs sponsored by private and government agencies over the past five years, a process, suggested by William Kroll and now commonly referred to as the Kroll process, is still the only commercial one for producing material that can be processed to massive, ductile metal. Sponge titanium metal is quoted at five dollars per pound, and fabricated materials, such as thin rolled sheets, bring as much as fifteen dollars per pound.

Efforts are constantly being directed by the Bureau toward reducing cost of producing and fabricating titanium. Experiments performed in the research section that look promising or hopeful will be continued on a larger scale in the new development section, where their potentialities and processing cost can be appraised on a scale of from 400 to 2,000 lb. of metal per day. Metal produced in this plant will go elsewhere for further testing in its fabrication and application.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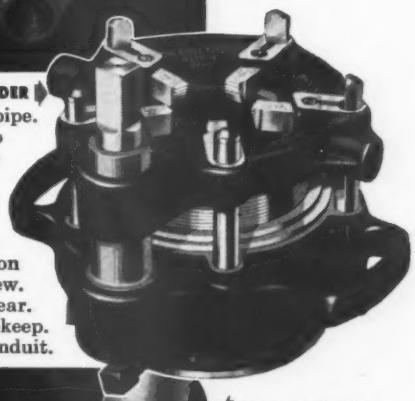
Work-Saver Die Stocks

JAM-PROOF 65R
Perfect threads on 1" to 2" pipe with 1 set of 4 high-speed steel dies — sets to pipe size in 10 seconds. Lead screw on barrel won't jam on workholder—drive plate automatically kicks out driving pawl. Self-centering workholder sets instantly!



4P GEARED THREADER
For 2½" to 4" pipe. Balanced loop handles—easy to lift 4P where you want it. Mistake-proof workholder sets to size before put on pipe—1 set screw. Safe enclosed gear. Practically no upkeep. Special 4P for conduit.

00R RATCHETS
For ⅛" to 2" pipe. Heads snap into ratchet ring from either side, won't fall out. Precision-cut alloy dies reverse for close-to-wall threads. 00R and 0R, ⅛" to 1"; 111R and 11R, ⅛" to 1¼"; 12R, ⅛" to 2". Conduit dies, too.

EXTRA VALUE
RIDGID's are famous for efficient design, smooth performance, rugged durability. Every die stock factory tested. For top value for your money, buy RIDGID threaders from your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

# UTILIZATION OF SULFITE LIQUOR
## is aim of Crown Zellerbach research

SULFITE LIQUOR, the river-polluting waste product of the wood pulp industry, may become a desirable industrial and agricultural raw material. At least this is the hope of Crown Zellerbach researchers, headed by Dr. W. W. Moyer, who are working on a new ammonia-base pulping project at their Lebanon, Oregon, plant.

The end product of this process, which has been given the trade name "Orzan," is essentially ammonium lignin sulfonate and wood sugar. It is now available in commercial quantities as a 50% liquid, and in experimental quantities as a spray-dried solid.

This combination of low-cost chemicals has found use as an adhesive or adhesive extender, as a wetting agent, as a dispersing agent for water-insoluble material, as a soil conditioner, as a yeast nutrient, and as a raw material source for the production of other organic chemicals.

The profitable use of sulfite pulp waste liquor—which constitutes half of the original log—has been the subject of many thousands of hours of research and has accounted for untold thousands of dollars expenditure on the part of the world's paper chemists. In the wasted 50% of the log there are organic compounds which could become the basis of an extensive chemical industry.

Limited markets have been developed, such as binders for foundry cores, bricks, and ore briquets; adhesives such as linoleum paste; and various organic chemicals, with vanilla as an example. According to estimates, total present market is less than 5% of the possible pulp mill output. To give some idea of the magnitude of this output—one slide rule expert has calculated that the energy content in the liquor wasted from the nation's sulfite pulp mills is equivalant to twice the output of Bonneville and Grand Coulee Dams.

Evaporation to recover either the heat or chemical content of the liquor is a costly process calling for large capital outlay for corrosion-resistant equipment. The main factor is then, the elimination of stream pollution. For this reason, Crown's research chemists at the Lebanon pulp mill have spent two years of study with a pilot recovery plant using an ammonia instead of the usual calcium base. The ammonia process allows an easier concentration of the liquor and the recovery of sulfur dioxide if the resultant concentrate is burned for fuel. An additional and very important advantage is that the spray-dried solid has apparent chemical and agricultural uses not possessed by the calcium-base product.

Quantity-wise, two of the most promising fields of exploration lie in its use as an additive and extender for plywood glues and as a soil amendment. For the latter, "Orzan" has been tried by farmers and nurserymen with very promising results. It seems to perform as well as fish meal and is much less expensive. It is unique among organic soil conditioners in that it is soluble and will disperse readily.

Evaporating equipment which will reduce the waste liquor to 50% solids suitable for some commercial uses and for burning for the plant process heat is scheduled for the Lebanon mill. "Orzan" spray-dried solid will be produced only on an experimental basis at present. Installation of production equipment will be governed by demand.

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BARRY CONVEYOR PULLEYS
Welded steel construction. Light in weight yet extremely strong. They're easy to install. Available in a wide range of sizes for all general conveyor services.
DICK ROPE V-BELT DRIVES
V-Belt and sheaves operate with engineered efficiency. Give maximum service with minimum stretch . . . Resilience maintained. Sheaves carefully balanced and accurately machined to minimize belt wear.
POWER TRANSMISSION AND CONVEYING EQUIPMENT
Industry has recognized through years of experience that Dick power transmission and conveying equipment has a reputation for greater efficiency . . . longer life . . . and rugged ability to absorb repeated peak operating demands. Call or write the R & J Dick Co. office nearest you for help in increasing the efficiency of your production.
FACTORY SALES REPRESENTATIVES FOR
ATLAS ROLLER CHAIN, SEWALL ROLLER CHAIN SPROCKETS, GILMER V BELTS AND HIGH SPEED ENDLESS BELTS.
BARRY STEEL SPLIT PULLEYS
Scientifically designed — electrically welded construction. Light in weight. Easy to install. Maintain exact shape under all loads.
DICK'S BALATA BELTING
Constructed of hard surface, closely woven duck. Thoroughly impregnated with Balata Gum. Free from stretch and shrinkage — and moisture resistant. High in power transmission efficiency. All "Dick-belts" guaranteed.
MF 551
R. & J. Dick COMPANY, INC.
SAN FRANCISCO 7, CALIF. 510 BRYANT ST. SUTTER 1-1341
SEATTLE 4, WASH. 307 MARITIME BUILDING MUTUAL 1922

## NOT ENOUGH TOOLS for Western industry

A POINT that many industrialists have suspected—the necessity for the West to produce more machinery—is brought out in a recent survey of the machine tool and manufacturing equipment needs of Western industry.

Conducted by Trumpis-Collar & Associates for Hufford Machine Works, Inc., of El Segundo, Calif., makers of forming machinery used in aircraft and aluminum industry, the survey covered all types of manufacturing industries in thirteen Western states. It determined types of machinery needed and desired for future expansion and development by Western manufacturers and showed a direct ratio of requirement between different types and styles of machines.

Plus a continuing need for all types of basic machine tools, there is a growing demand for special manufacturing equipment machinery. There is increasing need for new, rugged, fast machines equipped with high speed automatic accessories—machines that will do basic service work, but still be adaptable to short run manufacturing of parts and units.

Says James L. Hess, industrial consultant of Trumpis-Collar & Associates, "Our survey indicated that almost 20% of Western manufacturing firms were prevented or have been unduly delayed in expansion plans by inability to obtain machinery when needed. In spite of this fact, over 62% of these Western manufacturers are planning for increased growth and expansion. To insure this growth so needed to support our expanding population, we must provide them with the needed manufacturing facilities produced in our own Western plants."

## INDUSTRIAL INSTITUTE dates scheduled

ACCEPTANCES have been received for the following speakers for the Fifth Annual Industrial Engineering Institute, to be held Jan. 30-31 at the University of California, Berkeley, and in Los Angeles Feb. 2-3:

Dr. Lilliam Gilbreth—"The Future of Industrial Engineering."

Dr. Dwayne Orton—"The Job Enlargement Program at IBM."

L. D. Miles—"Organization for Cost Reduction in the Purchasing Department."

M. R. Lohman—"Job Evaluation."

Dr. Ellis Johnson—"The Application of Operations Research to Industry."


# WATERSPHERE

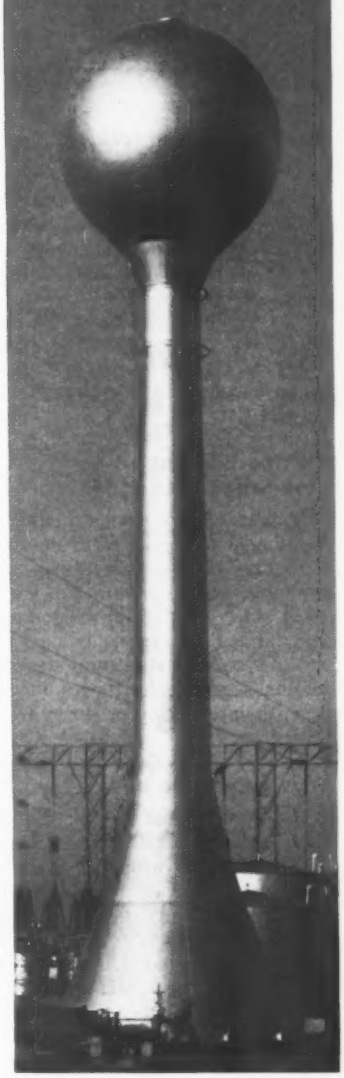
## Stores two-day Reserve of Water for Electrical Substation

Around the clock fire protection! A water supply that flows by dependable gravity pressure! These are some of the reasons why the Southern California Edison Company installed a 25,000-gallon Horton Watersphere at its Center Substation 20 miles southeast of Los Angeles.

Officials in charge of the Company's Engineering Department estimate that the 25,000-gallon Horton Watersphere stores enough water to take care of all of the general service needs of the substation for two days. This includes water for the condenser cooling system, domestic use, and lawn sprinklers. If something should happen to the well or pumping equipment at this 52-acre plant site, the reserve water in the Watersphere will take care of all normal water requirements until service can be restored. The 25,000-gallon Watersphere also provides gravity pressure for 33 fire hydrants in the distribution system.

Built in standard capacities from 25,000 to 250,000 gallons, the Watersphere provides the inherent advantages of an elevated water supply—more uniform water pressures and lower pumping costs. In addition to its basic utility, the modern design of the Watersphere presents a pleasing, streamlined appearance.

Other Horton elevated tanks are available in standard capacities from 5,000 to 3,000,000 gallons. Write our nearest office for quotations. State capacity, location, and height to low water line.



*Above: 25,000-gallon Horton Watersphere at the Southern California Edison Company's Center Substation 20 miles southeast of Los Angeles.*

CHICAGO BRIDGE & IRON COMPANY

| | |
|---|---|
| Atlanta 3.....2144 Healey Building | Los Angeles 17.....1570 General Petroleum Building |
| Birmingham 1.....1560 North 50th Street | New York 6.....3334—165 Broadway Building |
| Boston 10.....1065—201 Devonshire Street | Philadelphia 3.....1666—1700 Walnut Street Building |
| Chicago 4.....2132 McCormick Building | San Francisco 4.....1578—200 Bush Street |
| Cleveland 15.....2256 Guildhall Building | Seattle 1.....1369 Henry Building |
| Detroit 26.....1567 Lafayette Building | Tulsa 3.....1667 Hunt Building |
| Houston 2.....2164 C & I Life Building | Washington 6, D. C.....1171 Cafritz Building |

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

# HELPFUL LITERATURE

**for the plant operator who wants to keep informed**

*Use rip-out post-card for your free copies*

1

### How to operate fork trucks

Designed to be used in operator training schools, a comprehensive manual on fork truck operations is now offered by *Hyster Co.* Combining 2-color cartoon technique with detailed manual approach, the book shows not only how to handle a fork truck, but also preventive maintenance, safety and basic materials handling, and how to set up an obstacle course.

2

### Cutting building maintenance costs

Time and labor saving methods for building maintenance from foundation to roof are discussed in a 48-page guide available from *Stonhard Co.* How to solve water seepage in underground foundations, preserve concrete or wood surfaces, protect structural steel from rusting, repair leaky roofs and many other maintenance procedures are discussed.

3

### Wire rope data book

Condensed from *E. H. Edwards Co.'s* general catalog, this 24-page booklet provides wire rope users with a concise guide to every important phase of wire rope production, purchasing, maintenance and use. Detailed drawings and charts cover such subjects as cross sections, length, diameters, arrangements, direction of lays, cores, fabrication, sheave problems, and lubrication of wire rope for storage.

4

### Coil system savings outlined

The how and why of savings made by Platecoils in heating and cooling processes are described in detail by the *Kold-Hold Manufacturing Co.'s* new booklet. The manufacturer states that Platecoils can be used in all places where pipe coils are now used, but cost less initially, heat or cool up to 50% faster and take only half as much tank space as the pipe coils. A variety of heating and cooling processes are described.

5

### Data book on carbon-graphite parts

The combination of carbon and graphite to produce various mechanical parts which will run thousands of hours without attention is a process of the *Pure Carbon Co.*, under the trade name Purebon. The company has issued this 32-page book on mechanical applications of Purebon where lubrication is difficult or impossible, for bearings, seal rings, pistons, pump blades, valve seats, etc.

6

### Insulated wire time-savers

Helping assembly fingers fly in leads and wire connections is the purpose of the *Electra Insulation Corporation's* booklet on Suflex varnished tubing. Recent developments in untreated and treated sleevings, particularly where high and low temperature ranges are a factor are discussed. Booklet gives Suflex grades, sizes, colors, tolerances and other technical data.

7

### What about trucks on highways?

Answers to the common complaint "they ought to keep trucks off the highways" are furnished by "10 Challenging Statements . . . About Highways" a public service book published by *Fruehauf Trailer Co.* Pointing out that roads are primarily for the conduct of business and commerce, the book states that motor transports have little to do with road damage and they pay their full share for use and maintenance. Here's ammunition for anyone engaged in the battle of public transportation systems.

8

### Making smokeless fuel

*Stilcok Co.* has issued a booklet on their process for producing smokeless fuel or coke. The process which involves putting the heating surface inside the material being destroyed, drives oil vapors and gases into the cooler zones of the stills making recovery of valuable oil possible. The booklet gives a comprehensive description of apparatus, process and plant layout.

9

### All about Vitrohm resistors

A comprehensive 64-page Vitrohm resistor catalog is issued by *Ward Leonard Electric Co.* Listed therein are seven distinct stock type resistors and a variety of made-to-order types. Full details on terminals, mountings and enclosures are also given.

10

### Report on Colorado copper exploration project

A wartime sampling and metallurgical investigation of the *Colorado Copper Co.'s* properties in Sinbad Valley is described in a Bureau of Mines report released by *U. S. Department of the Interior.* Assay determinations were made on 204 samples from surface and underground workings, and these are included in the report. Maps and tables supplement the text.

11

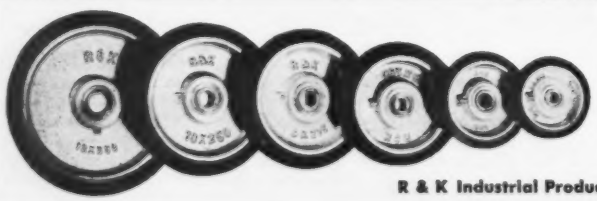
### Low cost water conditioning

Even the smallest plant can well afford water conditioning, according to a bulletin issued by *Uniflow Manufacturing Co.* The bulletin gives the basic information on the Uniflow system and capacity table for each model.

12

### Case histories of die-less duplicating techniques

The answer to your particular metalworking problem may be included in this 32-page catalog which gives photographic case histories of numerous companies applying die-less

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duplicating techniques. Described in tabular form for quick reference are the 7 Di-Acro metalworking machines manufactured by *O'Neil-Irwin Mfg. Co.* Complete information is given on this line of benders, brakes, notchers, punch presses, rod parters, rollers and shears. In addition, the catalog lists accessories and gives photos and description of new and improved metalworking products.

**13**

### What's available in industrial insulating materials

Industrial insulating materials which cover temperature range from 150 deg. F. to 1,800 deg. F., is the subject of a new 20-page catalog published by *Baldwin-Hill Co.* Insulating cement, block, blanket, felt and pipe covering are a few of the prducts shown. Complete with thermal-conductivity graphs and heat loss charts, this catalog also shows list prices. Application descriptions are included.

**14**

### Eliminating high cost of industrial dermatitis

A bulletin available from *Natriphene Co.* describes in full detail how to keep key men on important production-line machines by eliminating as far as possible high cost and waste of manpower caused by industrial dermatitis. Circle key number on postcard for your copy.

**15**

### Lime production survey

"Lime for Pacific Northwest Industries" by *Raw Materials Survey* is ready for distribution. It includes a section on lime production listing Pacific Northwest plants with notes on reserves, prices and specifications. It also summarizes industrial uses of lime, discusses specification desires of various consumers, and estimates quantity usage by industry.

**16**

### How to get efficiency from unit heaters

A new catalog presenting details about Airtherm propeller fan unit heaters is now available. Both horizontal and vertical units are covered. Diagrams show ideal arrangements for getting the most efficiency from unit heaters for areas of various shapes. Tables and charts show capacities of different models.

**17**

### Monthly woodworking information sheet

"Make It Yourself" is a monthly woodworking information sheet offered by *DeWalt Inc.*, makers of power cutting tools. Though addressed primarily


HOW MUCH LOST PRODUCTION DO SLIPPING ACCIDENTS COST YOU!

ACCIDENT REPORT

Cause of accident: Man slipped on oily machine-tool base.

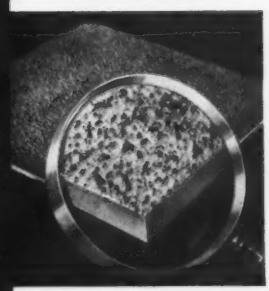
Means of prevention: Install A.W. ALGRIP Abrasive Rolled Steel Floor Plate.

Count the cost of slipping accidents—in lost man-hours, production lag, and insurance premiums. We think you'll see, at once, how much less it costs to put positive non-slip protection in your plant with exclusive A. W. ALGRIP Abrasive Rolled Steel Floor Plate.

NON-SLIP—EVEN ON STEEP INCLINES!

We make ALGRIP by rolling rough, tough abrasive grain (the kind you'll find in grinding wheels) uniformly as an integral part of the steel plate's upper portion. Hundreds of these tiny abrasive safety brakes grip your feet at every step—prevent slipping, even on wet or oily surfaces, even on steep inclines!

ALGRIP WON'T WEAR SMOOTH!



ALGRIP's safety is more than surface deep. The abrasive grain is distributed evenly and deeply, so that as the surface wears, new particles are exposed. Result: ALGRIP keeps its anti-skid qualities for a lifetime—without maintenance. And because rolled steel makes it stronger than other abrasive floorings, ALGRIP withstands hard blows and heavy loads—can be used in thinner sections without reducing load carrying capacity.

LEARN HOW LITTLE SAFETY COSTS TODAY

Our new Booklet A-6 gives full technical details, suggests uses for ALGRIP. We'll be glad to send you a copy and answer any questions you may want to ask—without obligation. Write us today.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

*Other Products:* PERMACLAD Stainless Clad Steel • A.W. SUPER-DIAMOND Floor Plate • Plates • Sheets • Strip • (Alloy and Special Grades)

Over 125 years of iron and steel making experience.

to home users of the DeWalt Power Shop, it will carry items of detailed woodworking information of interest to all those engaged in phases of woodworking.

18

### Caustic soda booklet

*Dow Chemical Co.* has revised its booklet covering all phases of caustic soda. Booklet specifically deals with manufacture of caustic soda, chemical and physical properties, economics involved, methods of handling and storing, technical data, etc.

19

### Kaiser describes light weight steel

Properties, characteristics and use for Kaisaloy, a low-alloy, light weight steel, are described in a booklet issued by *Kaiser Steel.* The company states that for many applications, Kaisaloy will handle unit stresses ¼ to ⅓ higher than its common steel equivalent without sacrifice of performance, service life or safety.

20

### Cost cutting with hack saws

*The DoAll Company* offers helpful work hints for obtaining the best in finish and production with hack sawing operations in a new folder on their complete line of hack saw blades. All the information necessary in ordering power or hand blades is given, as well as a speed and feed chart for cutting different materials. Bulletin 50-823.

21

### Complete information on two electric-powered trucks

*Lewis-Shepard's* Jacklift Electric and Master Jackstacker truck models are featured in a complete catalog by the manufacturer. Describing the latest engineering and operating features of the two units, the catalog is fully illustrated with photographs, specs, engineering drawings, and maintenance features. Specifications regarding capacity loads, open end clearance and fork lengths are included.

22

### Modern plant design three-way service described

*MacIsaac and Menke Co.* has a 28-page brochure designed to help you visualize your own plant needs in terms of today's plant design. Details of the company's packaged, three-way service, includes general construction, machinery installation and industrial piping. A special section is devoted to recently developed techniques in speed and economy, such as the tilt-up method of wall erection.

TAILORED TO YOUR EXACT REQUIREMENTS

When you have trouble getting steel exactly suited to your fabricating needs... Call Calstrip. We are Mill men in the business of developing and processing special cold rolled strip steel. Whatever gauge you want from .010" to .125"... in any width up to 13" with round, square or dressed edges you can depend on Calstrip to be consistently within the specified gauge and temper. The uniformity of physical and chemical characteristics of Calstrip cold rolled strip steel reduces your rejects and gives you more finished parts per pound. If you want technical help or more information on Calstrip steel call UNderhill 0-1344.

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7140 Bandini Blvd., Los Angeles 22, Calif.
Phone: UNderhill 0-1344

# Your Water Treatment Problem

## and how to handle it

A booklet covering the essentials of water analysis, filtration, softening, scale removal, cost reduction by recirculation, cooling tower efficiency.

***Plus***

a tabulation of water analyses for hundreds of cities in the eleven Western States.

This is a reprint of a series of articles which appeared in *Western Industry* in 1950-1951. The tabulation of water analyses is the only thing of its kind available anywhere.

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952

23

### How to conduct business with the Air Force

A revised guide for selling to the United States Air Force is made available by the *Western Air Procurement District*. With the decentralization of procurement by the Air Force, a full chapter covers information on the nature of policy change and lists depots and air materiel areas having responsibility for transacting business. A special section is devoted to small business interested in obtaining contracts.

24

### Results of plant layout survey shown

Analysis of the best types of equipment used for plant layout purposes has been published by *"Visual" Planning Equipment Co.*, giving the results of an independent survey. The report comparing 4 types of layout equipment to determine which is best suited to the planning of a manufacturing building, deals with the cost of each plan, and the intangible advantages such as accuracy, durability, rapidity of reproduction and appearance of layout for presentation purposes.

25

### All about conveyor units

Eleven standardized conveyor units are described in a bulletin 63C by *Standard Conveyor Co.* A description of each unit, specifications for usage and guides for ordering the conveyor best suited for your purpose are shown. Various roller, wheel, belt and elevator units are illustrated and cross section drawings shows typical incline angles necessary to obtain best advantage.

26

### Ways to speed up feeding

*The Raymond Corp.* is offering three bulletins on their hydraulic operated sheet and strip feeding tables. Bulletin 262 describes the single pedestal type, capacity of 2,000 lbs.; bulletin 265 deals with the scissors-type model, capacity of 6,000 to 10,000 lbs., and bulletin 263 shows the heavy multiple-cylinder table with a capacity of 10,000 to 20,000 lbs. Specifications and illustrations of each model in use is given.

27

### Planning expansion?

If you are planning industrial expansion, you will find a fast, low cost method described in this Butler Steel Buildings booklet offered by *Butler Mfg. Co.* Illustrations show the typical rigid frame designs offered by the company, as well as exterior and interior views of installations made throughout the country.

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609 Mission Street

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1. For your free copies of **HELPFUL LITERATURE** reviewed in this issue, circle appropriate key numbers.
2. For more information on **NEW MATERIALS AND EQUIPMENT** previewed on following pages, circle key numbers.
3. For complete information on **PRODUCTS ADVERTISED** in this issue, fill in page number and name of advertiser.

Send free booklets and more information on new products listed under circled key numbers:

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
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| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
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New products and manufacturers' booklets reviewed in *Western Industry* are screened and selected for your needs. The advertisers in *Western Industry* call your attention to important services and developments available to Western firms in this period of dynamic growth. Take this opportunity for aid in keeping your business in step with this growth.

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**28**

### Business facts about Arizona

A study of the state's economical health entitled "Arizona Business Births and Deaths, 1948-51" has been issued by the Employment Security Commission of Arizona. In addition to showing the completely new firms started during the four year period and the firms which ceased operations, the study lists other business transactions such as change of ownership, legal reorganization and exemption. Both statewide and county analyses are reported by industry sub-classification.

**29**

### Production economies with Presdwood

*Masonite Corporation* has issued an illustrated booklet enumerating the applications and specifying various of the 23 types and thicknesses of Presdwood for specific purposes in industry. Directions on how to apply and use the product are included.

**30**

### Slip-on pipe fittings described

Pipe fittings which completely eliminate threading or welding are described in a booklet available from *The Hollaender Mfg. Co.* The time and money saving advantages of Nu-Rail slip-on fittings, engineering data and list prices are given. Dozens of uses are listed and illustrated where the fittings have simplified construction.

**31**

### New uses for colloidal graphite

*Acheson Colloids Co.* releases a six-page, two-color bulletin on "Colloidal Graphite for Surface Coatings and Impregnation." New uses as a dry-film lubricant are continually being found for electric furnace graphite of high purity, when it is rendered colloidal and dispersed in a suitable carrier. This bulletin discusses usages as diversified as parking meter surfaces to impregnating paper.

**32**

### Synthetic rubber packings

O-rings, synthetic rubber packings, is the subject of a 16-page illustrated booklet offered by *International Packings Corporation*, affiliate of *Graton & Knight Company*. Discussion covers basic rubber compounds, telling the advantages and shortcomings of each under atmospheric and chemical conditions, operating speeds and applied pressure. Extensive tables are given for both operating and static rings and recommended groove dimensions. Brief presentation is made of other types of packings made from synthetic rubber.

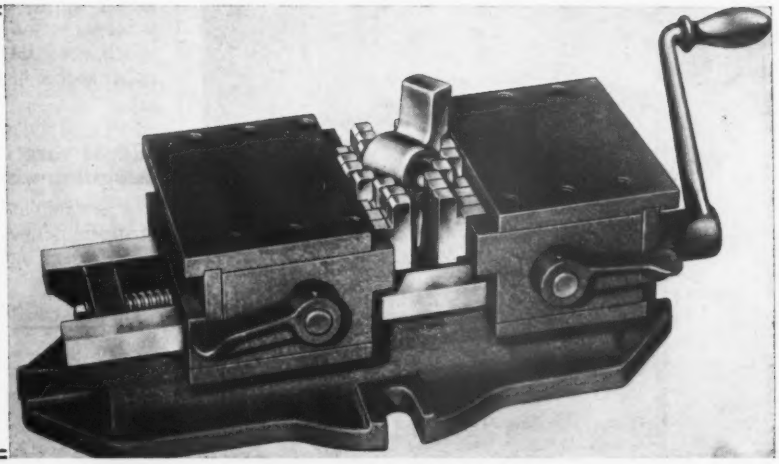
***USE RIP-OUT POSTCARD for more information on products introduced this month.***

# NEW MATERIALS & EQUIPMENT

33

**Mechanical octopus**

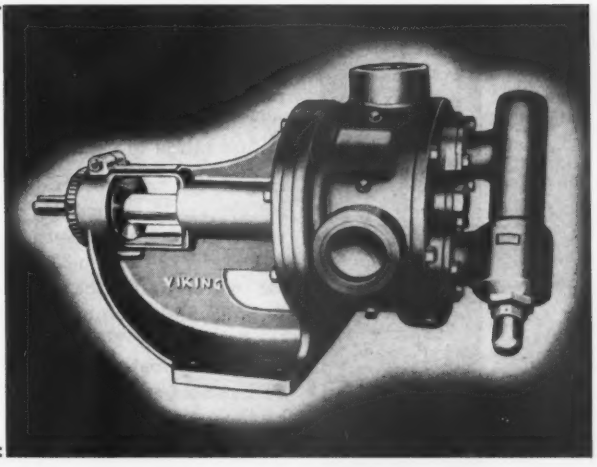
Construction provides gripping action with even pressure distribution throughout entire series of jaws, to hold oddly shaped pieces. American Positive Grip Vise is available from *Connors and Davis Sales Corp.*



34

**Truck mounting style . . .**

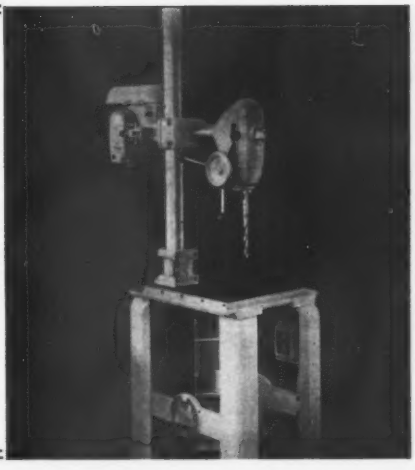
of Viking liquefied petroleum gas pump comes equipped with safety valve on head, extra long stuffing box and metallic packing, special treated gaskets, integral thrust bearing and revolvable casing for easy and complete selection of ports to suit your piping. From *Viking Pump Company.*




35

**This multi-purpose industrial drill . . .**

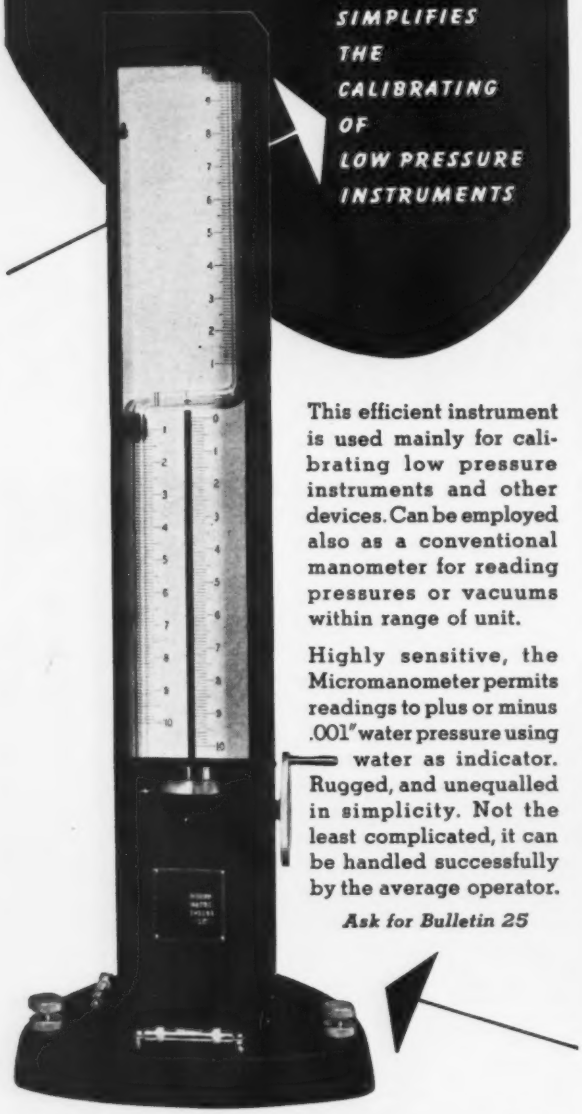
incorporates the following design advantages: capacity equal to conventional 17-in. and 20-in. drill presses; provisions for both horizontal and vertical mounting of the column; adjustable throat; angular adjustment of drill axis in relation to column; wide range of speeds; manual feed from both sides of drill head; power feed attachment with remote control; adjustable overload release. Magna Drill is made by *Magna Engineering Corporation.*



MERIAM

MICROMANOMETER

SIMPLIFIES THE CALIBRATING OF LOW PRESSURE INSTRUMENTS



This efficient instrument is used mainly for calibrating low pressure instruments and other devices. Can be employed also as a conventional manometer for reading pressures or vacuums within range of unit.

Highly sensitive, the Micromanometer permits readings to plus or minus .001" water pressure using water as indicator. Rugged, and unequalled in simplicity. Not the least complicated, it can be handled successfully by the average operator.

*Ask for Bulletin 25*

THE MERIAM INSTRUMENT CO.
10988 Madison Avenue • Cleveland 2, Ohio
WESTERN DIVISION: 4760 E. OLYMPIC BLVD., LOS ANGELES 22, CALIF.
IN CANADA: PEACOCK BROS., LTD., MONTREAL

MERIAM Instruments
ESTABLISHED 1911

MANOMETERS, METERS AND GAUGES FOR THE ACCURATE MEASUREMENT OF PRESSURES, VACUUMS AND FLOWS OF LIQUIDS AND GASES


36

### Non-slip grip fasteners cope with higher torque loads

*Twelve-Point Fastener Co.* is manufacturing precision-forged, threaded 12-point aircraft type fasteners in ferrous, non-ferrous and precious metals—in all standard diameters and lengths, for industrial, automotive and marine use. These non-slip 12-point fasteners are designed to permit higher torque loads and will accommodate standard 12-point socket or box type wrench. They have a head design which, according to the firm, provides a "non-slip grip" for either socket or box type standard 12-point wrench.

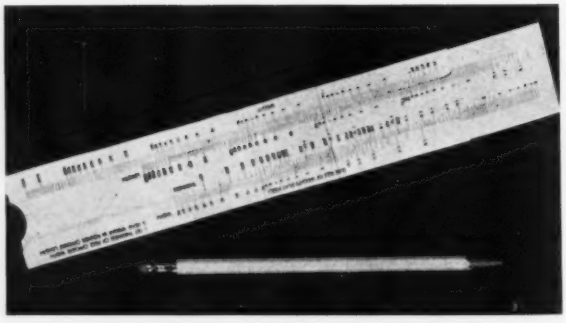
37

### Midget wire stripper removes insulation without breakage

A new miniature wire stripper, known as Type R Midget Stripper, is developed by *Rush Wire Stripper division of The Eraser Co., Inc.* Designed for removing film insulation from wire ranging from AWG 50 to AWG 40 inclusive, it may be used in conjunction with the coil winding machine, mounted on a fixed or swinging bracket or track. It can be used in horizontal or vertical positions. It employs 5/8-in. diameter fiberglas wheels that develop enough frictional heat to melt insulation and then wipe away residue, thus permitting complete removal of insulation without scoring or breaking wire.

38

### Improved slide rule figures exact weight of sheet materials



*Dayton Rogers Manufacturing Co.* introduces a new improved slide rule weight calculator for all flat sheet material. All that need be known is width of sheet or strip and pitch or number of lineal feet required for 1 to 100 pieces. Exact overall weight is then determined. A weight calculator is also provided with constants giving exact weight of sheet aluminum, copper, bronze, lead and steel.

39

### Electronic office machine prints calculations

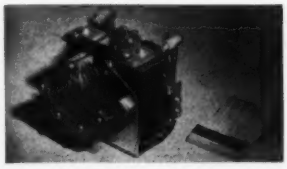
For the first time, an office size machine is developed that incorporates electronics. Rather than replacing business machines now in use, the "Computyper" combines a Friden calculator with an IBM electric typewriter through automatic control circuits. Now, a calculator may be operated

and the results are automatically printed. According to the manufacturing firm, by actual test, calculating and tabulating may be done four times faster and the human error element present in transposition of figures is eliminated. Available through *Benson-Lehner Corp.*

40

### Stepping switch is bi-directional

Model 27000 Bi-Directional Stepping Switch, from *Consolidated Engineering Corp.*, is adaptable to a wide variety of applications impracticable for conventional switches. Self-interrupted, completely reversible operation makes possible its use in many types of high-speed, differential counter and servo-mechanism designs. In addition to its direct use as a bi-directional switch in circuits requiring contact closures, unit is also quickly convertible to a stepping motor for special servo and control applications, as its output shaft is free at both ends for connections to many types of external attachments.



41

### Translucent building plastic is shatterproof and economical

*Plexolite Sales Co.* makes available a new 4 oz. per sq. ft. translucent structural plastic in both corrugated and flat surfaces. This fiberglas reinforced sheet is said to possess great flexural strength, is shatterproof and economical. In


TOUGH NEW WORK GLOVE with a TOUGH NEW COATING

SILVERTEX

These toughies will save you money, keep all hands cooler. Silvery coating reflects moderate heat radiation, resists cuts, snags, abrasion, and chemicals, won't crack or peel. Curved finger design, swing thumb, all standard styles.
*Write for name of your distributor.*

THE SURETY RUBBER CO.
Dept. A.

*Western Division*
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ROLLED RINGS and SLEEVES... STEEL
Weldless Carbon, Alloy and Stainless
72" and 40" Ring Mills
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1200 Ton Maxi; 350 Ton Hydraulic
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Carbon and Alloy Steel; Aluminum
4000 lb. and 6000 lb. Drop Hammers
Electric Forging Furnace Facilities
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# How to save money on repair parts!

**Use VICTOR Hardfacing Rods on Parts Subjected to Abrasion, Shock, Corrosion and Heat.**

Available in a full range of sizes for both acetylene and electric AC and DC application, both hand and automatic. Order a supply from your VICTOR dealer today.

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|---|---|---|
| VICTORALLOY | Abrasion and severe impact | Tractor rollers, dredge pump impellers, bucket lips and teeth, rock crushers, steel mill wobblers |
| VICTORTUBE | Severe abrasion | Scarifier teeth, dredge cutter blades, posthole augers, oil field tools, ditcher teeth |
| VICTORITE | Earth abrasion or sliding friction | Plowshares, cultivators, steel mill guides, cement chutes, shaft bearings, rolling mill guides |
| VICTORITE 1 | Corrosion, heat and abrasion | Saw-teeth, carbon scrapers, wire guides, rocker arms |
| VICTORITE 6 | Red heat, impact, corrosion and abrasion | Blanking, forming and trimming dies; cams, hot punches, pump shafts |
| VICTOR TUNGSMOOTH | Thin cutting edges | Coal cutter bits, brick augers, pug-mill knives, screw conveyors |

VICTOR

*For better welding equipment and supplies look for the VICTOR dealer sign. Dealer inquiries invited.*

303

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave. LOS ANGELES 58 | 844 Folsom Street SAN FRANCISCO 7 | 1312 W. Lake St. CHICAGO 7


industrial buildings, suitable for glazing, skylights and all types of lighting as it transmits up to 80% of diffused daylight. Sheets come in sizes up to 36 by 120 in.

42

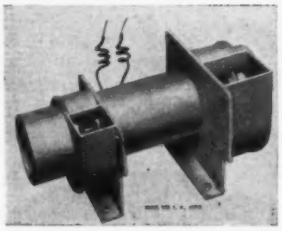
### "O" ring eliminates "flash"

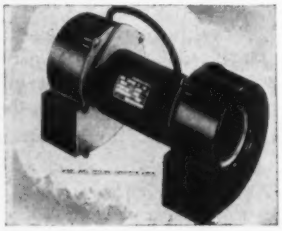
The *Wm. Porter Co.* has a new "O" ring manufactured by injection process which, company maintains, eliminates "flash." Rubber is injected into mold cavities through minute holes or sprues, thus eliminating any residual material and permitting formation of rubber parts to close tolerances with advantages of uniform rubber density, elimination of trimming labor, disappearance of trimming blemishes and low rejection rates. Complete tooling is available in both AN6227 and AN 6230 series.

43

### Fractional hp. motors blow cold for electronic equipment

Two fractional hp. motor blowers currently being used for cooling aircraft electronic and micro-wave relay equipment, are now available from *EMC and CYCLOHM divisions of Howard Industries, Inc.*





Model 100 DC motor (designed for aircraft): rated 1/50 hp. at 27½ volts; operates 4,500 rpm. at sea level, 6,500 rpm. at 50,000 ft., with a relatively constant air delivery of 40 cfm. Ambient temperature range is —65 deg. C. to +70 deg. C.

Model 2914, for micro-wave relay equipment, is a CYCLOHM induction motor rated from 1/100 to 1/15 hp.; operates at 1,650 rpm. with input voltage of 90-120 v.; is self-ventilated and comes with ball or sleeve bearing.

44

### Latex-base paint boon to industry

Now ready for industry is a new super-fast, latex-base wall paint, called Arcotone Vel-Lure from *The Arco Co.* Formulated specifically for industrial, school, institutional and commercial use, this fast-working paint was developed to provide for professional "big job" painting contractors and maintenance men the same production-speeding advantages that have made latex-base paints popular with home users—even coverage with minimum effort, fast drying, and absence of "paint" odor.

45

### Low temperatures for small scale production

*Sub-Zero Products Co.* puts out a new series of chilling chambers (XV-120), engineered to obtain temperatures of 140 degrees below zero for small-scale production chilling. Models are available from 1.5 to 3 cubic ft. Controlled temperature range is from —70 deg. F. to —140 deg. F. Heat absorption capacity is 250 Btu's per hour at —120

deg. F. normal operating temperature. Current uses of the units include stabilization of small precision parts, balls and bearings, treating and hardening of small amounts of tools and shrink-fitting on a limited production scale.

46

### Plastic traffic lane markers

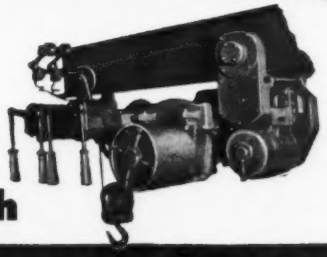
Saf-t-line markers, highly visible bright yellow (or white) plastic discs, are taking hold as a means to eliminate costly and constant painting of traffic lanes. They are three inches in diameter, feather-edged and taper up to a ¼-inch high center . . . warning vehicle operators or pedestrians by feel as well as by sight. Discs are injection molded of Tenite II (cellulose acetate butyrate), a plastic with tough durable qualities . . . having slight to no effect from oil, grease, hydrocarbons, or ordinary cleaning solvents. Manufacturer is *The Campro Sales Co.*, Industrial Products division.

47

### Steel storage files save floor space

From *Aurora Equipment Co.* comes new, accessible space saving steel storage files. Plus compactness, they permit use of "sky room" area thus making maximum use of storage locations. Waste upper space is utilized and valuable floor area conserved. Aisle space need only be 24 in. wide. Records go directly from current files onto shelves in chrono-


STRETCH MANPOWER



with

ELECTROLIFT

worm drive hoist

Just one man can lift and move those heavy loads around your plant, with ElectroLift.

Safe, compact, smooth, quiet, fast . . . with a choice of many models for any use. Capacities up to 6 tons. Optional pushbutton control gives pin-point accuracy.

For further features, consult your ElectroLift representative in telephone directory.

ELECTROLIFT

ELECTROLIFT, INC., 30 CHURCH ST., NEW YORK 7, N. Y.

*"Don't you think it would be a good idea for us to see about a new business letterhead?"*

*"Good idea! Let's look in 'Classified' under Printers for someone who can do the job for us!"*

**You'll find letter** and addressing service, adding and calculating machines, copy service and office supplies . . . most everything you may need in your business listed in the Yellow Pages of your telephone directory. That's why, when they want any product or service, so many businessmen turn first to the Yellow Pages.

**Are you reaching** all the people you should with your listings and advertisements in the Yellow Pages? It pays to be represented under enough headings to cover your full line. That way you'll be sure to get your full share of calls from the 9 out of 10 people who use the Yellow Pages as their best local shopping guide.

**You'll find it fast in the**

**YELLOW PAGES**

**of your Telephone Directory**

Pacific Telephone

## Cut cleaning time in half

**NO BRUSHING**, scrubbing, scraping with this Oakite Steam-Detergent Gun. It cleans and rinses at the twist of a valve. Its powerful hot cleaning spray quickly breaks up, floats off even the heaviest soils, no matter how hard to get at. Tops for cleaning large parts, machinery, floors, etc. Tops for paint stripping, too.

**FREE FOLDER** gives details. Call, or write, Oakite Products Inc., 1001 E. First Street, Los Angeles 12 or 681 Market Street, San Francisco 5. No obligation naturally.

SPECIALIZED INDUSTRIAL CLEANING

**OAKITE**

REG. U. S. PAT. OFF.

MATERIALS • METHODS • SERVICE

*Technical Service Representatives in Principal Cities of U. S. & Canada*


logical, alphabetical or numerical order. Finished in olive green baked-on enamel, units are 3 ft. wide by 7 or 10 ft. high with wide choice of depths. Shelves adjust vertically on 1½-in. centers and any unit may be removed without moving adjacent units. Assembly may be added to as need arises.

*Use rip-out postcard for more information*

48

### Non-chippable enamel coats polyethylene

*Schwartz Chemical Co., Inc.*, develops a new synthetic enamel for solving the problem of coating and decorating chemically inert polyethylene. Called "Polynamel" the new lacquer has excellent adhesion, does not peel or chip, and has unusual toughness and flexibility, according to Schwartz chemists. Although it can be air-dried, baking or force-drying at 150 deg. F. for one hour is recommended for best results. It comes packed in one- and five-gal. cans and in 55-gal. drums.

49

### Chemical cloth removes static with one wipe

De-Stat Cloth, a product designed to solve the problem of static electricity inherent in many industrial products, is new development of Globe Laboratories. With a single wipe, this cloth is said to remove all static charges and prevent their recurrence on such materials as plastics and plastic-base paints, synthetic and natural rubbers and rubber-base paints. If kept free from dirt, it can be used indefinitely. Regular size 18 by 18 in. cloths are packed


## *Kicker Arms* . . . powered by NOPAK Cylinders

### . . . sweep boards from Conveyor to Transfer Belts

An important phase of the panel-gluing operation at Potlatch Forests, Inc., Lewiston, Idaho, is the transfer of boards coming from the glue applicator on a conveyor belt to the transfer belts which deliver them to the electronic gluer.

As each board hits the "bumper", a solenoid valve, controlled by a microswitch, actuates a NOPAK Model "E" Cylinder. The cylinder piston rod is coupled by bell-crank linkage to roller-tipped kicker arms which swing in a horizontal arc over the conveyor belt to sweep the board off the conveyor belt to the transfer belts which run at right angles to it.

This materials-handling operation is typical of many similar applications in which NOPAK Valves and Cylinders are used. For others see the NOPAK Application Manual.

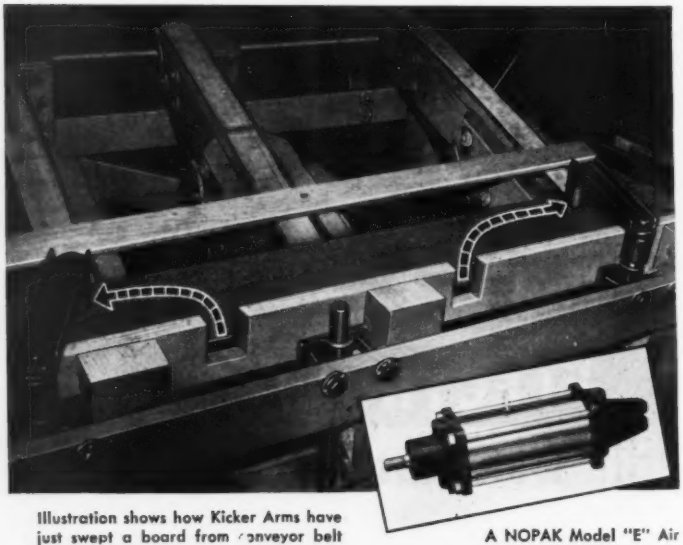


Illustration shows how Kicker Arms have just swept a board from conveyor belt to transfer belts.

A NOPAK Model "E" Air Cylinder is used in the installation pictured.

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**VALVES AND CYLINDERS**

**DESIGNED for AIR and HYDRAULIC SERVICE**

Refer to Sweet's File for Product Designers or write for Bulletin SW-1.

A 7250-½-H

1 dozen to a box for $24.00. Roller cover yardage comes 36 in. wide by any desired length. Available from *Globe Laboratories.*

50

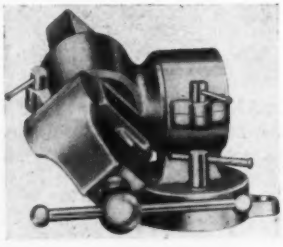
### Here's a plug-in humidity control

*Abbeon Supply Co.'s* new Plug-In Humidity Control is now off production line. For operation, control is hung on a wall and dial is turned to percentage of relative humidity desired. When used as a dehumidifier control, if humidity rises above setting, will turn on the dehumidifier. When humidity falls below set percentage of relative humidity, dehumidifier will automatically shut off. If used with a humidifier, control turns it on at low humidities and shuts it off when desired humidity is reached.

51

### A vise that is flexible

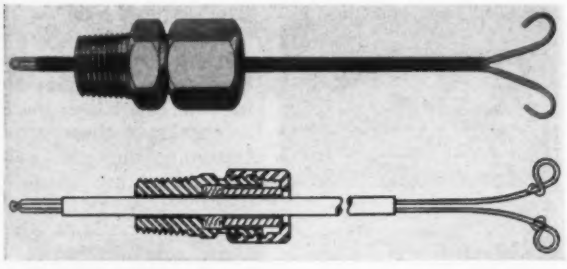
FlexiVise will allow you to twist work to suit your own working conditions instead of making you twist yourself to suit the work. Firm claims that with Flexi-Sleeve attachment any holding position is possible regardless of angle, as it has a 360-deg. rotation on 3 planes and can be locked in any position. From *FlexiVise Company.*



52

### Packing gland adaptable as sealant

New Midget Packing Gland (Model MPG) is designed as a standard seal for entry of small dial-type thermometers, thermocouple wells, pitot tubes, static pressure probes, round rods or tubes or even insulated electric lines. As a tube seal, it may be used as a standard male connector for tube ends or as a standard compression fitting. In either application, soft sealant used will not damage tube. Adaptability will, according to firm, provide maximum utility and ease of installation in production and process control, pilot plant, laboratory and experimental applications involving pressure systems of gases, vapors and liquids in closed vessels under positive and negative pressures. Available from *Conax Corp.*



53

### Chlorophyll-treated felt controls odors

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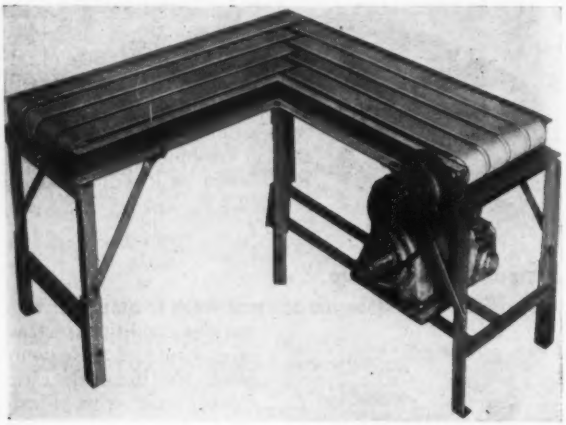
laboratories of *The Felters Co.* This new product, named "Chloro-Felt," imparts a clean smell, is non-staining and non-toxic. It is expected to be used for a wide range of products such as hat band fillers and shoe components.

54

### Power-driven roller curve eliminates conveyor line slow-ups

This unit, manufactured by *Harry J. Ferguson Co.*, is available in 90- and 180-deg. curves. It is said to eliminate slow-ups, jamming and stoppage, and maintains uniform



rate of flow for conveyor line. Minimum height of unit is 18 in. Drive is a ⅓-hp., 115/230-volt, 60-cycle single-phase reversible motor with reducer and chain drive.

55

### Recirculating valve positively leakproof

A recirculating valve that may be used for any stream dividing application of gases, air, salt water, oil and mild chemicals to 125 psi. is now in production. Design incorporates a combination of time-proved plug principles and O-ring sealing. It is claimed that a positive leakproof condition is obtained and that loads and internal wear are reduced to a minimum by use of an externally adjustable spring seating control featuring multiple ball pressure contact against a hardened wear ring. Valve is available in cast aluminum, steel or Navy bronze. Bronze and steel valves are cadmium plated throughout. Flange connections are available for either male or female thread adaptation. Available from *Ardee Manufacturing Co.*

56

### Hydraulic gadget positions and weighs hoist loads

A new, inexpensive hydraulic development, in use by both Army and Navy for accurate positioning and weighing of hoist loads, is now available to private industry. Known as "Hydra-Set," this device is a load-weight actuated cylinder-and-piston link between hoist and load. In use, the craneman positions load a few inches above desired location. Rigger at the load then eases into desired position by operating needle control valve. Valve operates manually at rigging point, or can be operated from a distance by a

steel wire cable and spool similar to a fishing reel. Velocity of descent is always under control and accuracy of movement within one thousandth of an inch requires no special skill. A 20-ton capacity model weighs 65 lbs. and can be handled, installed and operated by one man. Manufactured by *Mefco Sales and Service Corp.*

*Use rip-out postcard for more information*

57

### Pocket-size instrument measures vibration

A new pocket-size instrument, called the Fowler "Vibra-Tak," for accurate measurement of speed and amplitude of vibration on machinery or bins and hoppers where vibration is produced to aid materials movement, is now available to industry through *Martin Engineering Co.* It has a range of 2,000 to 15,000 cpm. Higher speeds register and can be closely estimated. Uses include finding vibrations per minute; checking rpm. of high speed machines, if vibration is present; revealing "dead spots" on equipment; locating unwanted vibration on other equipment.

58

### Solderless terminal for control panel wiring

For use in intricate control panel wiring, *Aircraft-Marine Products, Inc.*, makes a new solderless terminal. Reinforced Ampli-Bond Terminal's design assures that no underlying conducting surface will be exposed even if the insulating sheath is pierced. This is accomplished by means of an insulated metal ring near base of the insulation support sleeve. Ring gives all necessary strength to combat vibration and sharp bending, but does not communicate with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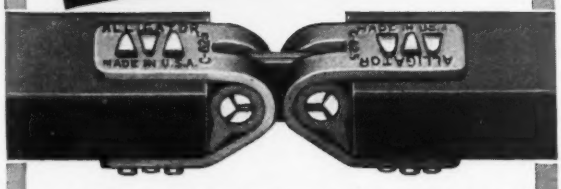


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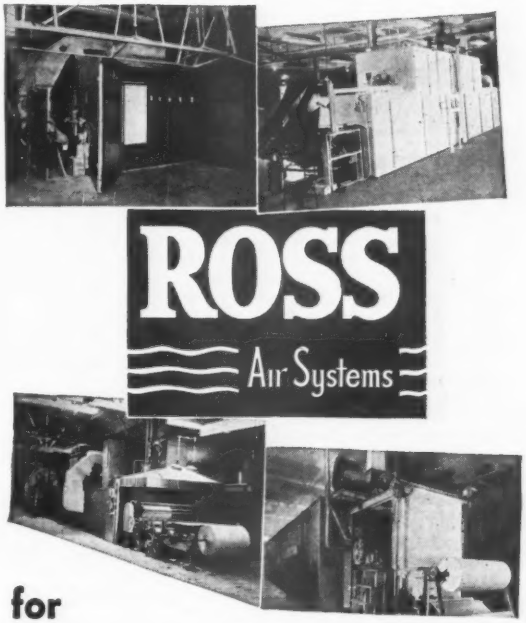


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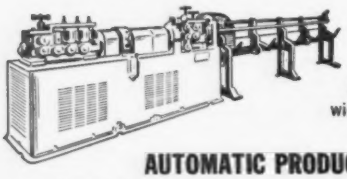

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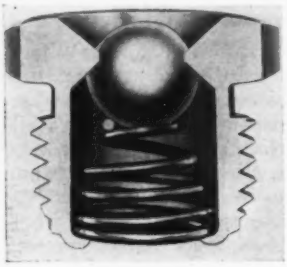
electrical connection farther up the barrel. Color coded, these are now available in 12-10 and 16-14 HD sizes, and soon will come in smaller wire sizes.

59

### Flush-type grease fittings can't be knocked off

The problem of protruding heads of ordinary grease fittings being knocked off by a blow or collision is remedied by a line of flush-type grease fittings just introduced by *Universal Lubricating Systems, Inc.* New type fitting presents little obstruction or opportunity for collision that might knock it off and impair machine's function. It is made with a ball check supported by a spring and prevents oil or grease leakage caused by back pressure. The back-up spring is designed so passage through it at point of fullest depression is greater than opening at top of fitting, thus providing free flow of lubricant.



60

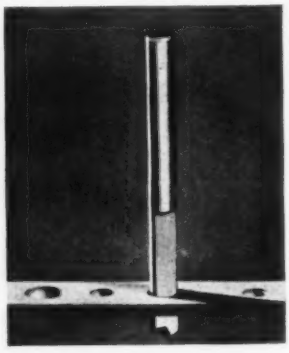
### Microporosity solved with special resin

Salvage of castings rejected because of microporosity can now be achieved on a regular production line basis. A new combination of sealing materials and impregnation methods now makes possible 100% "filling" of microporous voids in metallic castings and solves the old foundry problem. Process is based on use of a specially-formulated thermosetting resin which is 100% reactive—all of the sealant converts into a solid. It is said to be resistant to a wide variety of solvents, to withstand continuous exposure to temperatures up to 350 deg., and, while hard, is resilient enough to allow for expansion and contraction of the metal because of temperature variations. This process is particularly valuable for pressure type castings. Polyplastex impregnation method is development of *Polyplastex International, Inc.*

61

### Size range increased for carbide drills

*Super Tool Co.* increases range of standard sizes carried in stock for their "Super-Hard" carbide drill specially designed for drilling hardened steel. Eleven sizes—⅛ to ½ in., will be stocked in standard round shank style (solid carbide end) and 10 sizes: 5/16 to ¾ in. in hex. shank (carbide tipped) style.



62

### Dipping basket and solvent for quick cleaning of parts

"Gumout," *Pennsylvania Refining Co.'s* solvent for parts cleaning, is now available in a special 4-gallon pail which includes a rugged, light-weight, metal dipping basket. New package, called "Gumout 'n Basket," enables mechanics to quickly clean nearly any type of automotive part by merely placing it in dipping basket and immersing in

solvent for a brief period of time. Projecting handles of dipping basket make possible immersion and drainage of parts without touching the cleaning solvent.

63

### Portable yard ramp loads from ground level

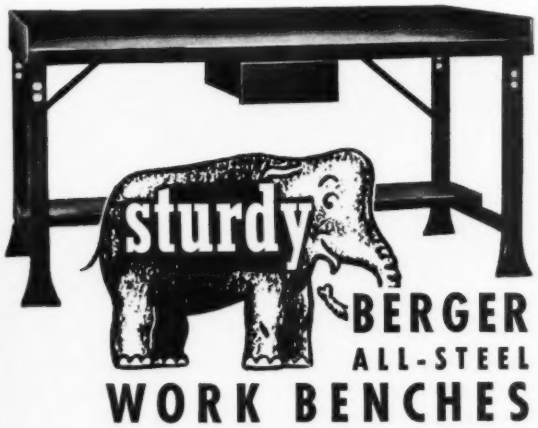
Materials handlers take note of *Magnesium Co. of America's* solution to loading and unloading freight cars from the ground level. They now make a portable magnesium Yard Ramp—obtainable in five standard sizes, all 30 ft.

long but varying in widths of 60 to 70 inches. Load capacities range from 6,000 to 16,000 lbs. In use, ramp is positioned in front of the freight car door and one end is raised by means of a hydraulic lifting mechanism. Lower end is on the ground which prevents ramp from being forced out of the car during loading operations.

64

### "Flowed-in" gasket applied as liquid

*Dewey and Almy Chemical Co.* makes gasket claimed to provide an improved seal at lower labor and material cost, as a replacement for conventional pre-cut cork or rubber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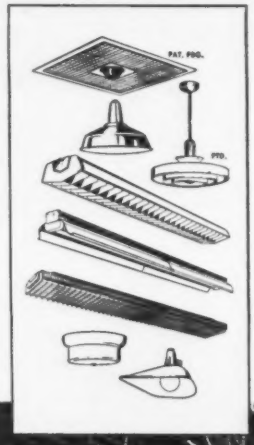
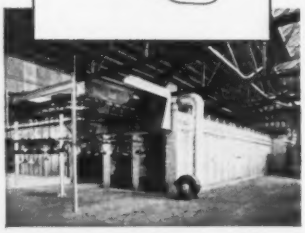


Engineers . . . draftsmen . . . designers . . . all know the slide rule is an all-important "tool," but certainly no more efficient than their ability to make full use of it. Don't invite eye-fatigue and impair job performance with poor illumination.

Smoot-Holman lighting equipment can solve this problem—as it has for thousands of workers in other western plants. Made to exacting quality standards, it provides illumination always ample, always correct for the eyes—light that's a perfect partner for production.

Equally important, there is a Smoot-Holman fixture to match any job's specific need! See your Smoot-Holman Lighting Engineer!



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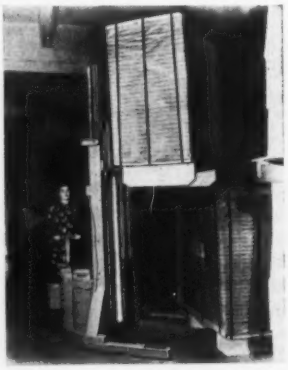
gaskets. Called "flowed-in" gasket, it is applied as a liquid, synthetic rubber or resin compound, forced through a nozzle onto a spinning component part and then baked to form a solid rubbery gasket which will not fall off the part. It can be applied either automatically or semi-automatically, depending upon lining equipment used, and in varying types, thicknesses and diameters.

65

### Electric lift straddle truck works in confined areas

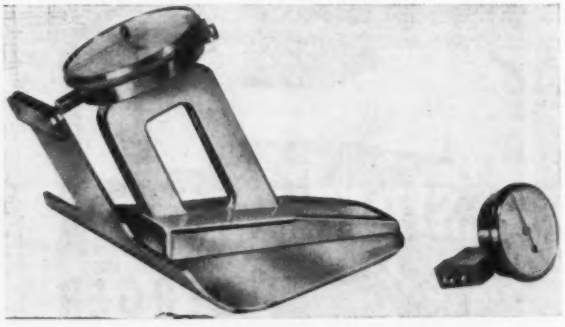
Revolvator's new "Go-Getter" is an electrically operated high lift straddle truck for use in narrow aisles and confined areas. Compact and efficient, the truck incorporates a "Hi-Straddler" lift with almost no overhand, thus permitting operation in 6-ft. aisles with 48-in. load lengths. Base of machine straddles the load and forks thrust under pallet or skid for lifting. All controls are at operator's fingertips. Capacity is 2,500 lbs. Lift is 83 to 115 in. Available from *Ira G. Perin Co.*



66

### For quick judgment of steel quality

A new means of quality control has come along incorporating the Flex-Tester, which by checking resistance to bending gives an accurate measure of cold-reduced sheet



and a strip steel drawing quality; and a spherometer, adapted to measure diameter of sheet's bend—found to give an accurate determination of a material's susceptibility to stretcher strain during draw. Entire testing takes less than a minute with little training of operators required. As many blanks as desired can be tested before drawing without destroying any material since samples are not necessary. Intruments will be available through *Steel City Testing Machines, Inc.*

*Use rip-out postcard for more information*

67

### Transfer process to color rubber and plastics

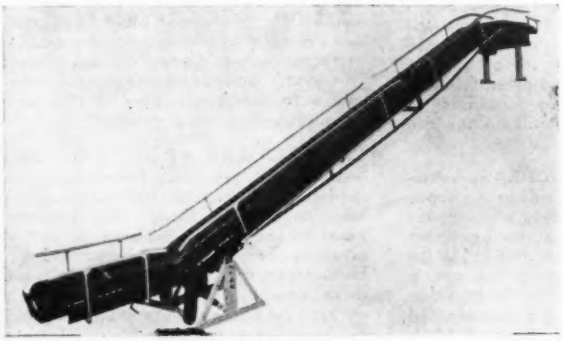
A newly devised, unique process of transferring multicolored, printed, screened impressions from paper to rubber or plastics, is called the Anolith method. It is econom-

ical, rapid, and once the indicia is made, image is said to last indefinitely. True reproduction of an image of even 300-line context is most important feature of this process. *American Anode,* a division of the *B. F. Goodrich Co.,* holds exclusive rights to this method and predicts such applications as sidewall color combinations for tires, drapery patterns for vinyl sheeting and imprinting of conveyor belting and rubber matting.

68

### Power belt conveyor replaces freight elevators

*Arrow Products, Inc.,* has a pre-engineered, permanently installed, reversible power belt conveyor called "Arr-O-Veyor" for use on both incline and horizontal applications.



According to firm, it often replaces worn out freight elevators, does a better job of speeding movement of materials between floors, and will bring that top floor far corner just as accessible as your loading dock for receiving or shipping.


Aeroquip

HIGH PRESSURE HOSE LINES

TWO-PIECE FITTINGS DETACHABLE AND REUSABLE

Tube and cover of hose are made of synthetic rubber, oil and grease resistant, reinforced with two high tensile steel wire braids. Available in sizes: ¼, ⅜, ½, ¾, and 1 inch. Fittings, easily assembled, are also available to service all types of greasing equipment.

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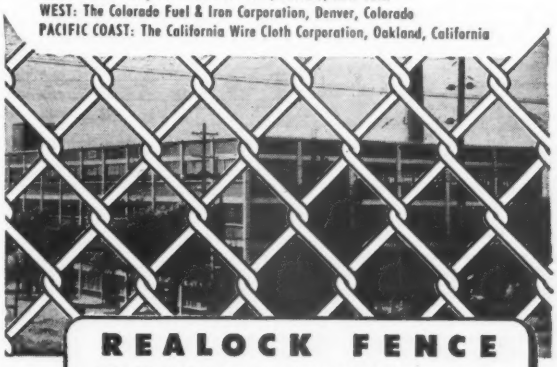
WEST: The Colorado Fuel & Iron Corporation, Denver, Colorado
PACIFIC COAST: The California Wire Cloth Corporation, Oakland, California



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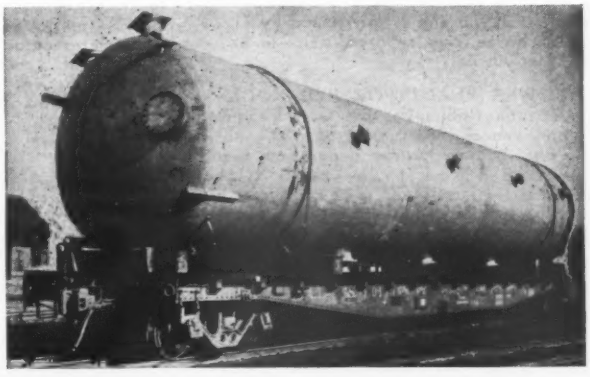

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Designed for 50# PSI internal pressure, ASME Code, with 40,000 gallon capacity (11' x 56') ten 6" - 18" flanges, wood slats and mounting skirt if used vertically. Especially suitable for **cold water wood slat deaerating or scrubbing; acids, salt solutions, chemicals or edible liquid storage; gas absorption or extractions; smoke, gas or "smog" control.** Alterations to suit your needs. *Immediate delivery.*

$13,000.00 each. Weight: 50 tons with slats; 35 tons without.

ALSO: 14" and 18" rubber lined pipe, Blaw-Knox gratings, walkways, railings structural steel, contractor's equipment. Write or 'phone TODAY!

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# THE WEST ON ITS WAY

## ARIZONA

**BAGDAD COPPER GETS BIGGER**—Defense Materials Procurement Agency guarantees Bagdad Copper Corp., Hillside, a market for 27,000,000 lb. of copper and 940,000 lb. of molybdenite a year. This contract, which runs for eight years, enables Bagdad Copper to undertake a $14,000,000 expansion. Program includes enlargement of present open pit mine and installation of electrolytic refining facilities. Improvements will permit company to produce 35,000,000 lb. of electrolytically refined copper and 12,000,000 lb. of recoverable copper a year. In addition, it will be able to produce 940,000 lb. of molybdenite concentrates to be used in high grade steel production.

**ASBESTOS** — Arizona Asbestos Producers Association completes contracts for sale of $80,000 worth of raw asbestos to U. S. government. Asbestos, to come from five Gila County producers, will be stockpiled at a Dominion mine warehouse until a $500,000 processing mill can be built. Mill, which will have a daily capacity of 50 tons, will be leased to a private company for operation.

**AIR FORCE BUYS HUGHES PLANT**—Hughes Aircraft Co.'s guided missile plant at Tucson is purchased by U .S. Air Force for a reported price of $22,000,000.

**POWER PLANT FOR RED ROCK**—Arizona Public Service Co., Phoenix, commences construction of a $12,000,000 open-air power generating plant near Red Rock to be known as the Sahuaro plant. Plant, to be completed by 1955, will be capable of producing more power than is now used in the entire Phoenix area.

**NEW BUILDING FOR DALEY ELECTRIC**—Soon to be completed is new factory and office building at 1825-29 E. Jefferson, Phoenix, to be leased by Daley Electric Co. Plant, which will have 13,200 sq. ft. of floor space, will have prefabricated concrete walls. Also to be installed is a 20-ton overhead crane for handling generator parts, transformers, motors and other heavy electrical equipment.

**MANGANESE ORE BUYING STATION**—Construction is started on a government manganese buying station at Wenden. Defense Materials Procurement Administration plans to stockpile there ore containing 134,520,000 lb. of manganese, most of which is expected to come from Yuma and Mohave counties. A sampling plant will be built on the site to test ore content.

**MINE YIELD WILL INCREASE**—Arizona mining companies will spend about $200,000,000 in expanding copper production facilities during the next two years. This means a possible 32½% increase in state's total copper tonnage; a potential hike of $65,640,000 in value of its metal products, and an anticipated total annual payroll increase of $16,898,600 resulting from 3,800 new jobs.

## CALIFORNIA

**CONVAIR TRIANGLE** — Consolidated Vultee Aircraft Corp. receives order to build America's first supersonic delta wing interceptor for Air Force. This F-102 craft is a triangle-shaped plane designed for very high speeds in stratosphere, and incorporates significant improvements in electronics and armament.

**PHENOL PLANT FOR RICHMOND**—West's first phenol plant will be built by Standard Oil Co. of Calif. at Richmond. Approximately $4,000,000 will be spent on project.

**LARGER QUARTERS FOR JOHNSON & MAPE**—Johnson & Mape Construction Co., Inc., Menlo Park firm specializing in construction of pre-cast concrete buildings for industrial and commercial uses, moves to a larger plant at 540 Santa Cruz Ave., Menlo Park.

**TOOL HOLDER FIRM ESTABLISHED**—Marvic, Inc., is name of newly established firm to produce new type of tool holder. General offices are located at 350 Peninsular Ave., San Mateo.

**WESTERN COMPANY NOW SPRING DIVISION**—Seaboard Coil Spring Corp., Los Angeles, becomes a division of Associated Spring Corp., Bristol, Conn. However, present management continues to direct activities of this new division, with same personnel.

**CHRYSLER LAB AT SAN LEANDRO**—Chrysler Corp. plans installation of a modern production control metallurgical laboratory at its Dodge San Leandro plant to insure and improve quality of airplane propellers manufactured there. Laboratory will have three darkrooms, metallographic preparation room; salt spray, cold and humidity cabinets; spectrographic section, chemical laboratory and heat treating room.

**TITANIUM RESEARCH**—Ryan Aeronautical Co., San Diego, is awarded an Air Force contract for research and development in titanium. Project is to determine best methods for processing titanium for use in conjunction with exhaust systems.

**LINDBERG COMES WEST**—Lindberg Engineering Co., Chicago manufacturer of industrial heat treating furnaces and supplies, purchases 4½ acres of land adjoining Southern Pacific tracks at Los Angeles as site for a Western manufacturing plant. New branch is established to help Lindberg supply Western industry, especially aircraft, with heat treating equipment.

**AIRCRAFT ACQUISITION** — Marquardt Aircraft Co. is acquiring a plant and property from General Tire and Rubber Co. in the San Fernando Valley

. . . continued on page 92


***INDUSTRIAL PROPERTIES***
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*(See Page 105 for Rates)*

# What do you do when it takes hours... sometimes days... to change v-belts?

**1** **Put one or several maintenance men on the job**

...and pay for repairs while production stands still

**2** **Pay overtime**

...and have repair costs eat away your profits

**3** **Standardize on VEELOS...**

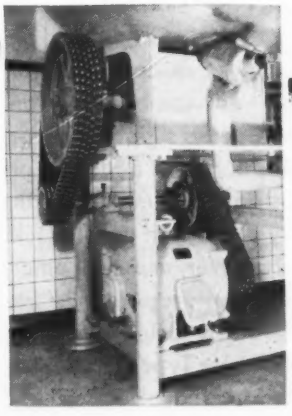
...and change belts in up to 1/10th the time
...save labor, save time and save overtime
...keep machines producing for maximum profit

***Comparison proves the value of VEELOS...***

**Minimum Inventory**—4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts. If you use only one width of v-belt you can stock just one reel of Veelos.

**Quick Installation**—link construction makes it unnecessary to remove outboard bearings.

**Complete Adjustability**—vibrationless, full power delivery is assured because uniform tension on each belt in a matched set can be maintained.



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gives complete details on construction, installation and uses. We'll gladly send you a free copy of this 28-page fact-full book... write today.

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**ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE**

Made in all widths in three types: regular, oil-proof, static conducting. Also in double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

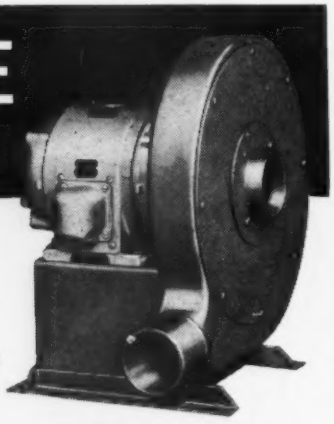
*Continued from page 90*

airport area consisting of 26 acres of land and 115,000 sq. ft. of buildings. Property to be utilized as part of firm's jet engine development program for armed services, is being financed through Reconstruction Finance Corp. loan of $765,000.

**CENTRAL MANAGEMENT SERVICES**—A new firm, known as Central Management Services, Inc., is formed to operate on a national basis, with headquarters in Los Angeles. Purpose of organization, besides management and over all guidance and supervision, is to present combined products and services, nationally, of a group of four wholly owned, diversified manufacturing and engineering companies, which are: Coast Paint and Chemical Co., Los Angeles; Aircraft Metal Forming Co., Inc., Burbank; Mid-State Manufacturers, Inc., San Marcos; and Aero-Cal Engineers, Burbank.

**REFRACTORIES FOR THE WEST**—E. J. Lavino Co., Philadelphia manufacturer of refractory and high temperature brick, builds new $2,500,000 plant at Newark to furnish these products to Western industry.


# HIGH PRESSURE BLOWERS



MEDIUM DUTY HP BLOWER TO ½ POUND PRESSURE

High rotative speed of the impeller creates a rotating column of air moving into the inlet. In the impeller this air is caused to move radially between the blades to the periphery by centrifugal force. The energy thus imparted is converted into pressure at the discharge opening sufficient to overcome the resistance set up to the flow by the equipment or apparatus attached.

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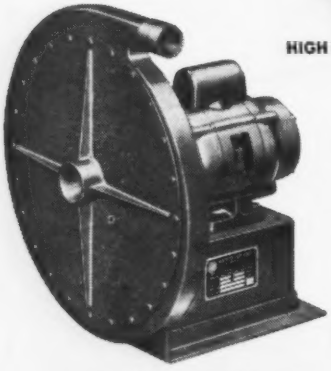
Industry presents many applications requiring air at substantially constant pressure but variable volume for varying conditions. Typical would be supply of air for combustion to an oil burner, supply of air or gas to a gas burner in a furnace or industrial oven. Maximum air delivery is required only for full load. However, under all other conditions the pressure must be maintained while the volume is reduced. Master Type HP Blowers will be found ideally suited for this and similar applications.



HIGH DUTY HP BLOWER TO 2 POUNDS PRESSURE

**MASTER FAN CORP.**

1323 Channing St., Los Angeles 21, Calif. VA 1037


**SAN QUENTIN TEXTILE MILL**—According to Richard A. McGee, State Director of Correctional Institutions, California's first cotton textile mill is expected to open behind the walls of San Quentin Prison soon. Mill will produce about $1,033,000 in textiles annually and make a net profit of $130,000.

**MORE POWER TO SAN DIEGO**—San Diego Gas and Electric Co. adds another 66,000-kilowatt unit to San Diego area's power supply.

**HIGH PROTEIN VALUE**—Cudahy Packing Co. plans to build a new modern packing plant somewhere in the Los Angeles area in about a year. New plant will replace present operation at 803 Macy St.

**STEEL FOR PIPE LINE**—Ebasco Services, Inc., New York, agent for West Coast Pipe Line Co. completes arrangements for 24 in. and 26 in. steel pipe required to run 960 mile crude oil pipe line from Wink, Tex. to Norwalk, Calif. Kaiser Steel Corp. and Consolidated Western Steel division, United States Steel Co. will each supply approximately 40% of the necessary 210,000 tons of steel pipe. Complete deliveries will be made by third quarter of 1953.

**RESEARCH CONTRACT** — Rheem Manufacturing Co., Aircraft Division, Whittier, receives a major research contract for U. S. defense program. Value of contract is reported to be in the million dollar bracket.

**ROTEX RELOCATES** — Rotex Punch Co., Oakland manufacturer of turret-type punches, small mill machines and accessories, commences construction of a new $200,000 plant on a two-acre site at Alvarado St. and First Ave., in San Leandro.

**GATES PAPER CO. SOLD** — Sonoco Products Co., Hartsville, S. C., buys Gates Paper Co., Southern California maker of industrial paper products, for an unknown sum.

**TILL TIDINGS**—National Cash Register Co. completes agreement to acquire controlling interest in Computer Research Corp., Hawthorne, for about $1,000,000.

**PERLITE** — California Perlite Corp. starts construction of its new plant at Klondike. A 240 x 42-ft. building will be erected to house crushing plant and four storage bins of 375 cu. yd. capacity. Storage bins are located next to Santa Fe Railway tracks.

**UNCOMMON CLAY**—Sierra Talc & Clay Co. of California, Los Angeles, erects new $500,000 mill at Grand Island, Neb., to process raw talc from company mines in Nevada and California.

**NEW INDUSTRIAL TRACT**—Webb & Knapp, Inc., purchase 900 acres of land for industrial development in San Bernardino Valley east of Los Angeles. Land will be serviced by Union Pacific and Santa Fe railroads.

**KODAK DPI DIVISION SOLD**—Consolidated Engineering Corp., Pasadena producer of analytical instruments for science and industry, purchases Eastman Kodak Co.'s Distillation Products Industries Division at Rochester, N. Y. Con-

solidated Engineering will continue to operate this vacuum equipment business in Rochester. DPI's distillation operations and its business in vitamin concentrates and synthetic chemicals are not involved in this sale.

**A FISH STORY** — California Packing Corp. acquires the Oxnard packing plant of San Carlos Canning Co. to handle its sardine canning and Southern California fishing operations.

**BURBANK BOOSTER**—Ampco Metal, Inc., Milwaukee, Wis., plans a 50% increase in its Burbank casting plant. Plans call for addition of 3,200 sq. ft. to present building. Plant will account for approximately $500,000 of Ampco's sales volume this year.

**ANAHEIM GETS VACUUM CLEANING**—Interstate Engineering Corp., El Segundo, buys 4½ acres in Anaheim for $20,000 for location of a $125,000 factory building. New plant will supplement firm's present plant by increasing production capacity from 25 to 30%. Company will transfer its vacuum cleaner production there and also some of its defense work.

**LANE-WELLS DOUBLES FACILITIES**—Lane-Wells Co. purchases five acres of land, adjoining its Los Angeles headquarters, from Madsen Iron Works, Inc. Plot will more than double firm's present facilities.

**PAINT PLANT FOR NILES**—American Chemical Paint Co., Ambler, Pa., acquires offices and plant facilities at Niles for a West Coast manufacturing operation. Facilities cover 46,000 sq. ft. and production plans call for manufacture of metal working chemicals, rust-proofing and paint-bonding phosphate coating chemicals and pickling acid inhibitors.

**TILE TALE** — Mastic Tile Corp. of America, Newburgh, N. Y., is equipping its Long Beach plant with a $500,000 production line which will increase West Coast's plant output by over 90,000,000 sq. ft. per year. Firm is also expanding its Long Beach warehousing facilities by 40,000 sq. ft.

**WOOD WORK** — Superior Sales Co., Sacramento, takes over operation of planing mill and lumber storage facilities of Dover Lumber Co. in Arboga.

**LASSEN LUMBER LIQUIDATION** — Lassen Lumber and Box, Inc.'s shareholders dissolve that corporation and divide its assets. Diminishing timber supply prompts closure of this 34-year old firm.

**WESTERN SKY INDUSTRIES** — California aviation and financial interests have recently formed Western Sky Industries at Hayward, an aircraft component manufacturer. Initial production is being concentrated on center wing sections for Navy's AD series of all-purpose attack bombers. The plant, containing 60,000 sq. ft. of floor space, is valued at $1,000,000.

**EDCLIFF EDIFICE**—A new factory and administration building is under construction for Edcliff Instruments Co., Pasadena electronics manufacturer. Building will have tilt-up style concrete erection. Floor is of poured concrete and roof is of wood and composition.


# how do your materials handling methods *Measure Up?*

Photo courtesy Standard Oil Company of California

An inventory of your materials handling methods might be profitable to you today. Are your methods of getting materials through production processes really modern methods? Are you getting finished products to storage or shipping via the best and most economical way? In other words, has your materials handling kept pace as you have grown and expanded your production?

**A little time** invested in a close look at your handling methods might save you **many dollars.** Possibly, being so close to your own everyday problems, you have overlooked some things that could be improved. Look over your operations again . . . and, if you see room for possible improvement, call in your nearby Mathews' Engineer. He'd like to help you to get better and more economical materials handling.

## MATHEWS CONVEYER COMPANY WEST COAST
## SAN CARLOS, CALIFORNIA

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*Engineering Offices and Sales Agencies in Principal Western Cities*

**BRASS AND BRONZE**—H. Kramer & Son, Chicago, opens its California Division plant, located on 23 acres of ground at 631 South Aviation Blvd., El Segundo. New division is said to be most modern and up-to-date brass and bronze ingot smelting plant in the country. New project includes two 60-ton reverberatory furnaces, two rotary type furnaces, a number of tilting furnaces, a cupola and a radiator sweater.

**WELL CONTAINED** — Twisto Container Corp., with executive and sales offices at 900 Main St., Redwood City, and small experimental production plant at 7860 Santa Monica Blvd., Los Angeles, plans expansion into a new plant in Northern California. Plant site is not yet selected, but will have around 20,000 sq. ft., and personnel complement will be stepped up from 15 to between 75 and 90, after new plant is in full production.

## COLORADO

**RETORT AT RIFLE**—Bureau of Mines completes construction at Rifle of a demonstration scale retort that will employ a new and promising process for continuous extraction of oil from shale. Unit, built by Blaw-Knox Construction Co., Pittsburgh, Pa., under a $333,870 contract, is patterned after a six-ton-a-day pilot plant that has proved both efficient and economical.

**U. S. VANADIUM DOUBLES CAPACITY**—U. S. Vanadium Corp.'s uranium refining mill at Uravan has doubled in capacity as result of recent expansion program. Mill has been revamped to incorporate a new process specially developed for processing uranium ores with high lime content, which is believed to be the most efficient yet developed for recovery of both uranium and vanadium. U. S. Vanadium is a subsidiary of Union Carbide and Carbon Corp.

**FLUORSPAR GOES FAR**—Ozark Mahoning Co., Tulsa, Okla., invests approximately $1,000,000 in Colorado's fluorspar industry, which produces a mineral used in steel, aluminum, glass, enamel and silicone production. Firm which bought out a fluorspar mining and milling operation in North Park area, has built a new flotation mill, which guarantees production of the high quality, acid grade "spar" used in manufacturing hydrofluoric acid for industry.

**CHLOROPHYLL MILL**—National Chlorophyll & Chemical Co. constructs a $1,000,000 chlorophyll plant at Lamar which will be world's largest. New mill will speed development of this product for medicinal uses as well as its present uses. This "green stuff" may later be added to such products as paints, plastics and textiles.

**MANY OIL FIRMS IN COLORADO**—Western oil boom has drawn 120 new


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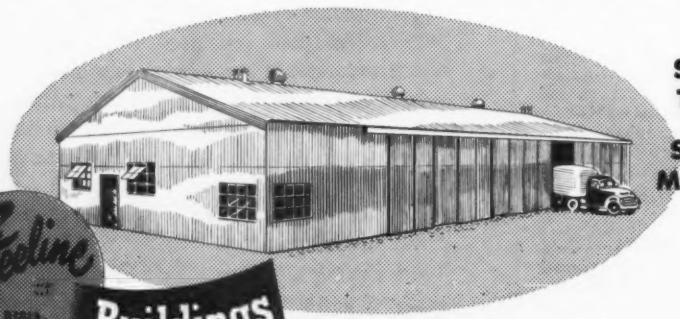

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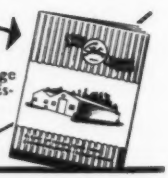

SS-214

companies into Colorado during the last ten months. Seventy-one out-of-state oil companies or allied firms have filed articles of incorporation in this state, and 49 new Colorado corporations have been established. This is a good illustration of the size of Colorado's oil boom.

## IDAHO

**CERTIFICATE OF NECESSITY** — Defense Production Administration issues a certificate of necessity for the following defense-connected industrial project: Continental Oil Co., $379,150 for petroleum storage at a fast write-off of 40%.

**CABINET GORGE IN ACTION**—Power now runs through first of four 50,000-kilowatt generators of Washington Water Power Co.'s Cabinet Gorge hydroelectric project on Clark Fork River. The $46,000,000 project is largest hydroelectric plant in Idaho.

## MONTANA

**NAME CHANGE** — The Harvey Machine Co., Kalispell, is authorized to change its name to Anaconda Aluminum Co. of Butte.

**BILLINGS FERTILIZER PLANT**—Rocky Mountain Chemical Co. selects Billings as site for a $8,000,000 plant to produce ammonium nitrate for fertilizer industry. Chemical to be produced in proposed plant will be extracted through a process using natural gas, water and electricity. About 120 tons will be daily capacity.

**FOR LOG LEARNING**—Superior Building Co., Columbia Falls, plans to log about 1,360,000 board ft. of Coram experimental forest, a part of Flathead National Forest. Objective is to study methods, costs and problem of reseeding. Included in contract is construction of 2.8 miles of road and also $1,400 worth of improvements to present Desert Mountain Road.

**WHITLASH GAS PLANT** — Recently completed by Montana-Dakota Utilities Co. is an absorption-booster plant near Whitlash. Plant will remove moisture


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ASHCROFT pressure gauges

Call REPUBLIC SUPPLY



Big steel Mill saves:

6 hours of down time plus 12 man-hours on each routine roller-journal overhaul

using Snap-on*

IMPACT SOCKETS and EXTENSIONS

Saving six hours of production time of a hot-broach unit in one of the largest mid-west steel mills undoubtedly earns enough money to buy many a set of Snap-on Heavy-Duty Impact Sockets!

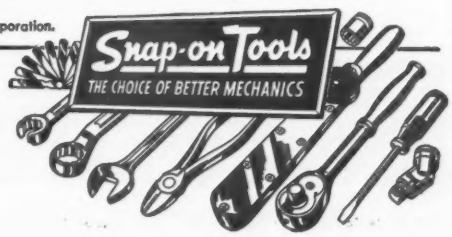
Add 12 man-hours of skilled maintenance mechanics' time and you've got a savings total to gladden the heart of any cost-worried works manager.

This job demands removal of 16 bolts on each roller. For years it's been a slow, sledge-wrench job, averaging 8 hours apiece for two workers. Today, using a 1½" drive impact gun, with Snap-on Impact Sockets and Extensions, the job is done in 4 hours.

Such savings are frequent among Snap-on users. Snap-on's nation-wide tool service — backed by 30 years' experience in tooling every type of industry for production, assembly and maintenance operations — is your assurance of the best obtainable tools for your needs. Write for catalogs and address of nearest Snap-on branch.

Write for industrial catalog and 104-page general catalog!

*Snap-on is the trademark of Snap-on Tools Corporation.




SNAP-ON TOOLS CORPORATION
8032-K 28TH AVENUE
KENOSHA, WISCONSIN

from natural gas in that company's eight wells nearby. Estimated cost is $500,000.

**TRUCK TOPIC**—The Frontier Manufacturing Co., Billings manufacturer of Frontier pickup tops, truck bodies and trailers, opens a factory on Laurel Road.

## NEW MEXICO

**OIL STORAGE**—Underground storage facilities for liquified petroleum gas—butane and propane—will be doubled in New Mexico by next year. Present storage facilities in this state are estimated at capacity of 265,000 barrels. This will be expanded to 515,000 by next year.

**GOVERNMENT CONTRACTS** — Five Albuquerque firms are awarded federal government contracts: Miller & Smith Manufacturing Co., $546,000 for bulldozers; Eidal Manufacturing Co., $163,000 for three contracts for trailer and dolly parts; Duke City Lumber Co., $141,000 for lumber; Sine Lumber Co., $104,000 for lumber; and C. J. Warren Lumber Co., $65,000 for lumber.

**LEAD-ZINC MINES CLOSED**—Kennecott Copper Corp. closes two of its Grant County lead-zinc mines due to recent price drop in zinc. About 160 men are affected. Empire Zinc Co., Hanover, closes its mine also.

**PITTANCE FOR POTASH**—National Farmers Union discloses discovery of a rich deposit of potash believed to amount to millions of tons, on 3,000 acres of its leases in Lea County. Organization is raising $6,000,000 to finance development of this discovery.

## NEVADA

**KAISER'S FLUORSPAR**—Kaiser Aluminum & Chemical Corp.'s fluorspar flotation plant, near Fallon, is now in operation, with a daily capacity of 100 tons of ore and 30 to 50 tons of concentrates per day.

**GULF OIL AT ELKO**—Gulf Oil Co. establishes its Nevada headquarters at Elko, and is constructing a large camp north of Deeth, preparatory to an extensive oil exploration program in northeastern Nevada.

**MORE TITANIUM**—Titanium Metals of America expands its lease holdings at Henderson's Basic Magnesium Plant, and output is expanded from one to 10 tons per day. Company is owned jointly by National Lead Co. and Allegheny Ludlum Steel Corp.

**TUNGSTEN**—Combined Metals Reduction Co. is now producing defense strategic tungsten at its Caselton plant in Pioche. Capacity of the Caselton concentrator is being increased from 1,100 to 1,900 tons of ore daily. New units include milling facilities for production of iron and manganese. Approximately $3,000,000 has been invested in new manganese concentrator. Lead, lead metal and zinc are other metals recovered from ores treated at Caselton.

## OREGON

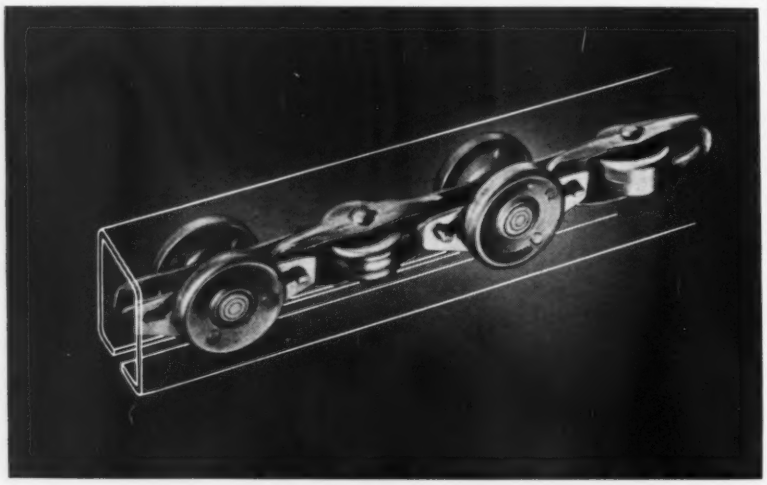
**SODIUM PERBORATE**—American Metallic Chemicals Corp. expands recently completed Portland plant in order to produce sodium perborate. About 100 men will be employed when production of this chemical gets under way.

**EXPANSION FOR PACIFIC PINE** — Pending final negotiations on a $100,000 Reconstruction Finance Corp. loan, Pacific Pine Products plans to install a fabrication plant at its White City site.

**PLYWOOD AT COQUILLE** — Associated Plywood Mills, Inc., Eugene, purchases 60 acres of property in Coquille for about $30,000. A ten-acre plywood mill is planned for the site.

**SPRINGFIELD ALUMINUM PLANT**—Construction of a silicon aluminum reduction plant is planned at Springfield by Apex Smelting Co., Chicago. Plant will be erected on a 13-acre site, purchased by that firm for $6,817.

**MORE ABOUT PLYWOOD** — Pressed Steel Car Co., New York, purchases Umpqua Plywood Corp., Eugene, and Axelson Manufacturing Co., Los Angeles. Both new acquisitions will be operated as separate divisions. Umpqua Plywood is a fully integrated plywood and lumber operation with 800 employees. Its capacity is more than 8,000,000 sq. ft. of plywood per month.

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**LIME LIGHT**—Anthony Brandenthaler, Baker lumberman, purchases Marble Creek limestone property of Chemical Lime, Inc., and plans early construction of a lime burning operation. Plant will have an initial capacity of 60,000 tons annually.

**TILLAMOOK BURN RESEEDING**—Approximately 5,000,000 seedlings will be planted over a 5,000- to 6,000-acre area in the Tillamook Burn section. About 80 men will carry out this work.

**HEPPNER FIRM BUYS TWO MILLS**—Heppner Lumber Co. purchases two Elgin lumber mills and their timber holdings. The two operations are Pondosa Pine Lumber Co., which consists of a planing mill and dry kilns and Hanford-Reed Lumber Co., a sawmill. They will be operated as the Elgin branch of Heppner Lumber Co.

**BOTTLES AND JARS**—The Owens-Illinois Glass Co. acquires approximately 70 acres of land in Portland's Parkrose area for a possible glass container plant. Portland site has access to rail and highway transportation, providing effective service to all marketing and producing areas in Pacific Northwest.

**ELDRIDGE PACKING BURNS** — Main plant of Eldridge Packing Co., one of La Grande's leading industries, was recently destroyed by fire. Loss is estimated at $100,000.

**LUMBER PLANT DESTROYED**—Central Lumber Co., Sutherlin, is destroyed by fire. Damage is figured at $75,000.

**LAMFORD BUYS B. C. FIRM**—Lamford Lumber Co., Mt. Vernon, purchases Mohawk Handle Co., Ltd., at New Westminister, B. C. This sawmill has been incorporated under the name of Lamford Cedar, Ltd., and cedar lumber will be manufactured at the mill which is equipped with dry kilns and a planer.

**CO-OP MAKES VENEER** — Western States Plywood Co., a newly formed cooperative near Langlois, is now producing veneer. Cooperative has a 20-acre plant site, and buildings include a 240-ft. sq. main building and a green end "L" 240 by 60 ft. Company spent $675,000 for construction and $125,000 for logs. A contract has been signed with MacArthur & Smith, Chicago, for plant's entire production for seven years.

**MORE FLAX**—Oregon Flax Textiles plant in West Salem will be expanded to double present production.

**TIMBER TALK**—Evans Products Co., Plymouth, Mich., purchases Mar-Linn Timber Corp. plant near Winchester for an undisclosed price. Evans values new plant at about $1,500,000. Plant has 83,000 sq. ft. of floor space and a capacity to make 48,000,000 sq. ft. of fir plywood annually.

## UTAH

**CERTIFICATE OF NECESSITY**—Defense Production Administration issues certificate of necessity for the following defense-connected industrial project: U. S. Steel Co. and Kaiser Steel Corp., Columbia, Dragerton, Sunnydale and


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**URANIUM ORE MILL**—Vitro Chemical Co., subsidiary of Vitro Manufacturing Co., Pittsburgh, Pa., plans to more than double capacity of its uranium ore reduction mill south of Salt Lake City. Capacity will be expanded from 165 tons to 350 tons of ore per day.

**KAISER HAS COKE** — Kaiser Steel Corp. plans to increase production of its coking coal at Sunnyside to 1,600,000 tons annually. Firm is now producing about 954,403 tons a year. A new high speed haulage tunnel at Sunnyside will reduce by one-half the time required to take men and materials out of mines, and thus speeds production.

**FLOUR MILL SOLD**—Roosevelt Flour Mill is sold to Uintah Basin Farmers Union Cooperative Association. It will cease to function as a flour mill and will be equipped to operate as a feed mill, with the installation of pellet-making equipment and other machinery for making various livestock and poultry feeds from hay and grain. No changes in personnel are anticipated.

## WASHINGTON

**PIPE LINE TO SPOKE**—Standard Oil Co. of California plans construction of a 140-mile petroleum products pipe line from Pasco to Spokane. This eight-in. diameter pipe line, with an initial capacity of 12,000 barrels a day, will cost about $4,500,000, including a pumping station at Pasco. Products to be shipped through proposed line will be brought to Pasco by barge up the Columbia River, and through a pipe line completed from Salt Lake City to Pasco two years ago.

Standard Oil Co. of California is also considering plans for possible use of a 2,000-acre tract north of Mukilteo as a refinery.

**MORE OIL**—Union Oil Co. of California is also laying plans for a Puget Sound refinery, possibly near Mukilteo, but no definite action has been taken as yet.

**MORE LIME**—Production of agricultural lime has begun at a new Columbia River Lime Co. plant near Ilwaco. Mill is capable of producing 350 tons of lime a day which is sold in bulk quantity.

**PHONE FIRMS ACQUIRED** — Pacific Telephone and Telegraph Co. acquires two independent telephone companies in Lewis County — Tri-County Telephone Co., and Pe Ell Telephone Co.

**NEW ROSSOE FACTORY**—Nelse Mortensen & Co. is awarded contract to construct a company factory and warehouse for Rossoe Manufacturing Co. in Seattle, for the sum of $85,765.

**FOOD FIRM SOLD**—Amos Wheeler and James Lewis purchase G. N. Turner Canning Co., Snohomish, from its founder, G. N. Turner.


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**OIL CONTRACT**—True's Oil Co., Spokane, is granted a contract to supply an indefinite amount of gasoline between November 1 and April 30, 1953 to federal supply service in Seattle.

**WINLOCK SITE FOR PERMA**—Perma Products Co., Chehalis manufacturer of machine-grained shakes, will move its West Coast plant to Winlock. Chehalis plant was destroyed by fire earlier this year.

**HANFORD GETS HUGE**—Henry J. Kaiser Co.'s contract for expansion of Hanford's atomic energy installations will amount to about $110,000,000, with another $28,000,000 to be spent on related projects. Kaiser Engineers Division, Oakland, has already begun work on this contract with 900 men on the payroll and about 600 to be added by the end of the year.

**CANADIAN PIPELINE AUTHORIZED**—Board of transport commissioners at Ottawa, Canada, authorizes Westcoast Transmission Co. to build a 960-mile natural gas pipeline from northern Alberta-British Columbia border area to Vancouver, B. C., and then to the British Columbia-U. S. border. Westcoast Transmission Co. now holds a 22-year permit to remove gas from Alberta, specifying 210,000,000,000 cu. ft. for the first five years. Line will start from Pouce Coupe section of Alberta and go to Dawson Creek, B. C., and Prince George, B. C., to Vancouver, with a branch leaving main line at Abbotsford, B. C., to hit U. S. border at a point near Huntingdon, B. C.

## WYOMING

**OIL LINES ASKED**—Continental Pipeline Co. requests authority to build 16.3 miles of pipeline in Sussex, West Sussex and Meadow-creek fields in Johnson County. Purpose of lines would be to gather Tensleep crude oil from these fields and transport it to company's terminal. Estimated cost of pipeline is $165,000.

**POWER PLAN**—Long-range program, designed to provide adequate electric power for Wyoming's growth is being initiated by state's utility companies. Ebasco Services, Inc. has been employed to study potential sites for major steam power developments.

**IRON PLANT RECONDITIONED**—Sponge iron pilot plant at Laramie is being reconditioned and will go into production again soon. Plant was severely damaged by fire in 1950.

**STOCKYARDS GO UP IN SMOKE**—Fire hits and destroys Union Pacific livestock barn and stockyards on southwest edge of Cheyenne, with a 260 head of sheep loss.


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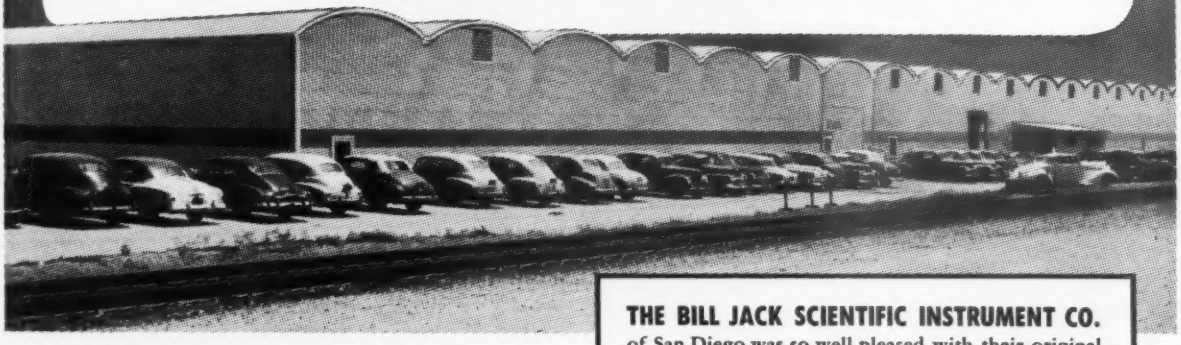

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# WESTERNERS AT WORK

## Arizona

FRANK WILLIAMS is appointed vice president and general manager of *Copper State Casket Co.*, Phoenix. Williams was formerly manager of Los Angeles Casket Co., Hollywood, Calif.

## California

*Fibreboard Products, Inc.*, names R. E. BUNDY as executive vice president. M. E. SANFORD, general production manager, replaces Bundy as vice president in charge of

*B. P. Altick* *E. J. Farina*

sales. B. P. ALTICK is new vice president in charge of sales, succeeding E. J. FARINA who retires.

FRANK BRAUGH joins *Helipot Corp.*, South Pasadena, as chief production engineer. He was formerly associated with *Hughes Aircraft Co.*, Culver City.

DR. J. R. RICHARDSON, associate professor of physics, University of California at Los Angeles, is appointed a senior reviewer for U. S. Atomic Energy Commission.

New assistant chief of Special Weapons Division, *Northrop Aircraft, Inc.*, Hawthorne, is ROBERT A. HALL, who has been engaged in guided missile research and development for that firm since 1946.

*Dalmo Victor Co.*, San Carlos, names CHARLES J. GERHARDT as assistant controller. ROBERT F. LEINICHE assumes duties of chief project engineer.

R. J. KRAUSE is now assistant to general manager of *Pacific Division, Bendix Aviation Corp.*, North Hollywood. Krause joined Bendix-Pacific six years ago as a missile development engineer.

V. C. IRVINE becomes Western division sales manager for *Shell Chemical Corp.*, succeeding G. W. HULDRUM, JR., appointed sales manager eastern division.

D. G. MALCOLM gives up post as assistant professor of mechanical engineering at University of California, Berkeley, to become vice-president in charge of engineering and production for *Bacon Vulcanizer Manufacturing Co.*, Oakland.

*Ford Motor Co.* names RALPH S. GORDON as Western public relations manager, with headquarters at Ford Division's Richmond assembly plant.

LEONARD B. ALLEN is new assistant plant manager of *Solar Aircraft Co.'s* San Diego plant. ERWIN S. BARNHART succeeds Allen as manager of quality control.

*Standard Oil Co. of California* assigns ARTHUR F. TURMAN to position of chief petroleum engineer for its producing department in San Francisco. Turman succeeds W. A. EARDLEY, recently appointed manager of producing department's northern district at Taft. J. T. CROCKER, formerly supervising petroleum engineer for producing department at Taft, replaces Turman as assistant chief petroleum engineer in San Francisco.

*The Rucker Co.*, Oakland, appoints R. R. HARRISON as assistant chief engineer and BRUCE MACDONALD and B. E. MCNAY as senior project engineers.

RAYMOND F. MORAN is named resident manager of Newark plant of *Westvaco Chemical Division, Food Machinery and Chemical Corp.* S. M. CIMINO is new general superintendent at Newark plant.

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ALVIN A. MEYROWITZ is vice-president and general manager of *H. Kramer & Co.'s* recently completed California Division plant.

*A. A. Meyrowitz* *J. Kritz*

JOHN KRIZ, formerly credit manager of *Joseph T. Ryerson & Son, Inc.'s* St. Louis, Mo., plant, is switched to credit and office manager of that firm's Los Angeles office. Kriz succeeds VERNON D. ROGERS, who is transferred to Chicago.

H. C. CRANFILL is appointed assistant to vice president—operations, *Columbia-Geneva Steel Division, U. S. Steel Co.*, succeeding R. B. FREEMAN, who is transferred to Foundry at Pittsburg as project manager.

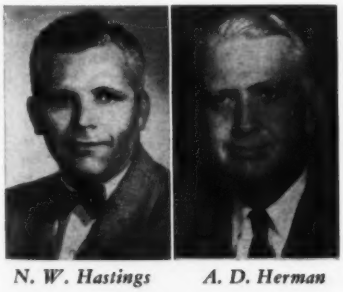
*Hoffman Radio Corp.* appoints HOWARD BRIGGS as assistant to president, *Hoffman Laboratories, Inc.* Briggs was formerly assistant vice president in charge of Hoffman's government contract office in Washington, D. C.

HARRY C. PERTZ assumes post of assistant service manager of Western division, *Caterpillar Tractor Co.*, San Leandro. EUGENE P. BARTA, service representative, is named eastern division assistant to succeed Pertz.

M. A. JAMES takes over as purchasing agent for *Preco, Incorporated*, Los Angeles, succeeding E. R. DAVIS. James was in charge of company's tool department prior to this advance.

Board of Trustees at *California Institute of Technology*, Pasadena, names ROBERT V. BARTZ as executive director of Industrial Associates for that institution.

NORRY W. HASTINGS is appointed chief chemist for *Rezolin, Inc.*, Los Angeles.



*N. W. Hastings* *A. D. Herman*

*Marman Products Co., Inc.*, names A. DALE HERMAN as vice-president and general manager. Herman was formerly associated with *Vickers, Inc.*, as general manager.

FRED HOLLIS is appointed sales manager of *Pacific Steelfiber Drums, Inc.*, Alhambra and Berkeley. Hollis was formerly chemical sales engineer for *General Chemical Division, Allied Chemical & Dye Corp.*

HARVEY H. MORRISON joins *Stillman Rubber Co.*, Culver City, as vice president in charge of production. Morrison was vice president in charge of production for *Los Angeles Standard Rubber Co.* before accepting this new appointment.

*Fluor Corp., Ltd.*, Los Angeles, names WILLIAM R. HAINSWORTH as technical advisor to executive vice president. Hainsworth was formerly research director and vice president in charge of engineering of *Servel, Inc.*

DR. R. W. MILLAR, head of *Shell Development Co.'s* physical chemistry department, named head of chemical engineering, relieving DR. MOTT SOUDERS, JR., who becomes director of development. DR. C. L. DUNN, assistant head of physical chemistry department succeeds Millar, and DR. R. L. MAYCOCK, development supervisor, physical chemistry department succeeds Dunn.

*R. E. Vannaman* *H. Helbock*

*Pastushin Aviation Corp.* appoints HAROLD HELBOCK as production manager. R. E. VANNAMAN joins that firm as personnel manager.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*Stanford Research Institute* names MERRITT L. KASTENS as assistant to director.

*Southern California Edison Co.* elects GEORGE N. HAWLEY as vice president, succeeding R. C. MCFADDEN, retired. JOSEPH R. BROOKSHIRE, administrative assistant, succeeds Hawley as assistant to president.

CHARLES R. LONG, Pacific Coast district engineer for *Westinghouse Lamp Division, Westinghouse Electric Corp.*, Los Angeles, is appointed a national director of the Illuminating Engineering Society.

GARDNER P. WILSON joins *Consolidated Engineering Corp.* as senior development engineer. Additions to engineering and research staffs of Consolidated Engineering include DR. WILSON S. BRUBAKER as senior research physicist and DR. PAUL BROCK as engineering mathematician.

CLARENCE M. YOUNG, vice president, *Pan American Airways*, heads up that company's Pacific-Alaska Division, succeeding HAROLD E. GRAY, recently elected vice president in charge of Atlantic division. Young will headquarter in San Francisco.

JOHN B. RIDDLE joins *Booz Allen & Hamilton*, management consultants, as staff consultant in the manufacturing group. He comes from Planning Division, Bureau of Aeronautics, Washington, D. C.

WALTER H. PARKS joins *California Redwood Association* staff for purpose of conducting manufacturing and quality control studies. New field representative for that organization in the conservation and public relations division is FREDERICK LANDENBERGER. Both will headquarter in Eureka.

DONALD H. LITTLE becomes manager of sanitation control of *Rosenberg Bros. & Co.'s* field, warehouse, processing and packing operations in California and Oregon. He was director of sanitation for *Dried Fruit Association of California* before joining Rosenberg Bros. HENRY NEWMAN, formerly manager of Rosenberg's Fullerton plant, is now manager of expanded Orange plant, succeeding JOSEPH HANDLEMAN, deceased.

THOMAS B. HOUSE joins *Northwest Canners Association* as assistant secretary-treasurer, succeeding A. L. HOBART, resigned.

*Instant Beverages, Inc.*, names BERT VAN CLEVE as general manager.

R. CURTIS TURNER, formerly assistant manager of *California Packing Corp.'s* Hawaiian division, is transferred to San Francisco to assist in pineapple operations.

## Colorado

RALPH L. PARTRIDGE, manager of *Great Western Sugar Co.'s* Ft. Collins factory, retires. He is succeeded by JOHN STEWART, manager of the Ovid factory. L. E. BUTLER, assistant to southern district manager, succeeds Stewart and C. R. JOHNSON, assistant manager at Scottsbluff and Gering, moves to Denver as assistant to southern district manager. Succeeding Johnson is LAMAR HENRY, fieldman at Longmont.

## Montana

FRANCIS O. CASE, vice president of *Anaconda Copper Mining Co.* since 1948, is elected president of newly-formed *Anaconda Aluminum Co.* Anaconda's primary aluminum plant, now in preliminary construction stage, is to be located near Columbia Falls, Mont. This $45,000,000 project, scheduled for completion early in 1954, will have two pot-lines capable of producing 50,000 tons of aluminum annually.

*Francis O. Case*

CLAUDE A. MCDONALD is named president of *Montana Lumber and Hardware Co.*, Lewistown. He succeeds W. E. MONTGOMERY.

## Oregon

CURTIS TRENHOLM is new assistant general manager of *Hansen Pacific* of Fortuna. He was formerly with *Fir Manufacturing Co.*, Myrtle Creek. WARREN HANCHETT of Eugene is a new forester at Hansen Pacific.

D. R. MCCLUNG is promoted to executive vice presidency of *Pacific Power & Light Co.*, Portland, and E. ROBERT DE LUCCIA becomes vice president and chief engineer.

ROBERT JACK is named manager of *Iron Fireman Manufacturing Co.'s* heating control division in Portland. He will be replaced as divisional controller of firm's Portland plants by HUGH RUSSELL.

A. R. DEWEY, general manager of *Edward B. Hines Lumber Co.* operations at Seneca and Hines, is named a company vice president.

CECIL ECKERT, general superintendent of *M & M Woodworking Co.'s* flush door division, is named manager of *National Tank & Pipe Co.*, a local subsidiary manufacturing wood tanks and pipe. He replaces RAY HANSEN, who leaves firm to start his own business.

## Utah

*American Gilsonite Co.*, Salt Lake City, makes following appointments to its executive staff: R. E. NELSON, engineer and formerly assistant to president, is new production manager; A. P. DOWLER, formerly vice president of Cork Insulation Co., New York

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City, is new general sales manager and will set up national sales headquarters for firm in New York City.

*U. S. Smelting, Refining and Mining Co.* makes following five promotions: MAX M. DUBOIS becomes assistant to manager of Western mines. He succeeds J. M. EHRHORN who is on special work in firm's Western operations. BENTON BOYD, formerly superintendent of Lark Section, replaces DuBois as general superintendent of U. S. and Lark Mine. HAROLD WELLS, formerly assistant superintendent of Lark Section becomes its superintendent. CLYDE GILLAM, engineer, replaces Wells.

D. A. OLSON, head of *D. A. Olsen Co.*, Salt Lake City air conditioning firm, is named president of *Little Valley Oil Co.*, Lovell, Wyo. HAROLD H. CUTLER, professor of banking and finance at University of Utah, is named vice president; M. EUGENE CARROLL, chief accountant for *Inland Empire Insurance Co.*, is secretary-treasurer; and GRAHAM CAMPBELL, former geologist with *Phillips Petroleum Co.*, becomes company consultant. Firm moves its headquarters from Lovell to Salt Lake City.

## Washington

THOMAS E. MOFFITT is appointed Western manager of the *Hooker Electro-chemical Co.*, and HORACE W. HOOKER, JR., becomes Western sales manager, succeeding ALBERT H. HOOKER, who is on extended leave of absence. Firm's Western headquarters are located at Tacoma.

DEANE A. KNAPP is named manager of *General Electric Company* traffic unit—purchasing and stores section, at *Hanford Works*, Richland. He replaces JAMES A. McSWIGAN, recently transferred to General Electric's Aircraft Gas Turbine division at Lockland, Ohio.

Succeeding ARTHUR BURGESS, resigned to enter private business, FRED A. WIREN moves into *Seattle Chamber of Commerce's* industrial department as manager. GENE KILLION replaces Wiren as manager of construction and planning and local affairs departments.

W. CHURCH HOLMES rejoins *Sunshine Mining Co.* and will be in charge of new projects. His headquarters will be in Spokane.

EMIL G. SICK is named chairman of *Sicks' Seattle Brewing & Malting Co.*, and *Sicks' Spokane Brewery, Inc.* Other promotions include: N. A. MACPHEE, vice chairman of board for Seattle Co. and president of Spokane firm; WILLIAM H. MACKIE, president of Seattle concern; ALAN B. FERGUSON, Seattle firm's vice president and general manager; and J. J. LEDERLE, general manager of Spokane concern.

On January 1, HAROLD R. HARRIS will become president of *Northwest Airlines*, and CROIL HUNTER, present general manager and president of firm, will become board chairman.

## Wyoming

*Crusader Corp.* and *Morton Oil Co.* name JOHN W. DENNY of Casper their superintendent of drilling and production. He was formerly a district superintendent for *Continental Oil Co.* in Wyoming.

## ASSOCIATIONS ELECT

*Pacific Coast Gas Association:* President, J. S. MOULTON, *Pacific Gas and Electric Co.*, San Francisco; vice president, W. C. MAINWARING, *British Columbia Electric Co.*, Vancouver; treasurer, HARRY MCGANN, *Pacific Gas and Electric Co.*, San Francisco; assistant treasurer, GROVER S. TRACY, *Pacific Gas and Electric Co.*, San Francisco; managing director, CLIFFORD JOHNSTONE, San Francisco; assistant manager, J. E. KERN, Los Angeles.

*National Association of Foremen:* President, EDWARD O. SEITS, management coordinator, *North American Aviation, Inc.*, Los Angeles.

*New Mexico Manufacturers Association:* President, C. L. MCCLASKEY, president, *M & F Equipment Co.*, Albuquerque; vice president, JOSEPH J. O'CONNELL, president, *Machine Engineering Corp.*, Albuquerque; secretary-treasurer, RICHARD FAULKNER, manager, *Eaton Metal Products Co.*, Albuquerque; secretary-manager, HENRY VERMILLION.

*California Fish Canners Association:* President, MAX J. GORBY, *California Marine Curing & Packing Co.*, Terminal Island; vice president, JAMES DE SILVA, *South Coast Fishing Corp.*, Terminal Island; secretary-treasurer, G. H. CLARK, *West Coast Packing Corp.*, Long Beach.

*American Institute of Steel Construction:* First vice president, EARLE V. GROVER, president, *Apex Steel Corp., Ltd.*, Los Angeles.

**CLINGAN & FORTIER, Inc.**

Aluminum and Steel, Sheets, Strips, Coils and Cut Lengths.
Aluminum Rods, Bars, Structurals, Trims, Extrusions and Windows.

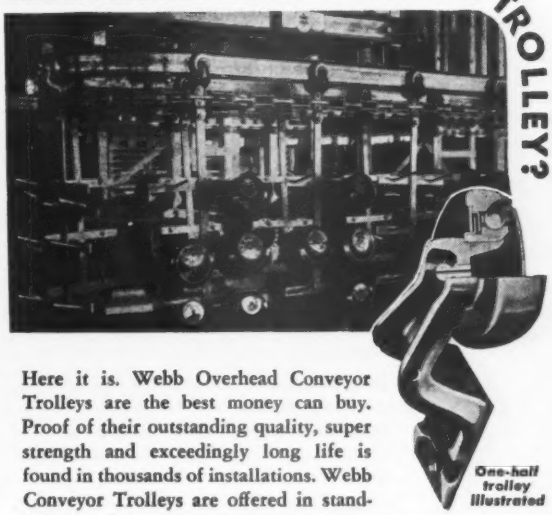
LOS ANGELES
2929 Santa Fe Ave.
LOgan 5-5414

FRESNO
1156 Parallel Ave.
FResno 2-2164

SAN FRANCISCO
1526 Wallace Ave.
Mission 8-0170

SEATTLE
1047 - 6th Ave. So.
MAin 7377

LOOKING FOR A BETTER TROLLEY?



Here it is. Webb Overhead Conveyor Trolleys are the best money can buy. Proof of their outstanding quality, super strength and exceedingly long life is found in thousands of installations. Webb Conveyor Trolleys are offered in standard sizes for original installation or replacement. Webb dependability is a tradition backed by over 30 years experience.

One-half trolley illustrated

Note the high carbon steel drop-forged swaged type bracket, retainer type ball bearings, double labyrinth grease seals, flangeless steel wheels with hardened and ground races.

**JERVIS B. WEBB COMPANY**

2650 E. WASHINGTON BLVD.
LOS ANGELES 23
KI 6165

2166 MARKET STREET
SAN FRANCISCO 14
KL 2-2709

CONVEYOR ENGINEERS AND MANUFACTURERS

# The Lufkin Line

By VIC FAWCETT

## BEHIND THE PRICE TAG

Vic Fawcett

***Lufkin Foundry & Machine Company*** had one basic policy when it was founded in 1902 — to produce quality equipment. Through good times and bad, the management has never deviated from that policy.

Your purchase of a ***Lufkin High Speed Increaser***, a ***Lufkin Heavy Duty Reducer*** or any of ***Lufkin's*** other gear products, buys more than quality, more than fine materials and workmanship. A dollar sign can neither be placed on the integrity, nor the responsibilty of the manufacturer. However, as every user of ***Lufkin Gear Products*** knows, these are the intangibles which are the cornerstones of the ***Lufkin*** organization, and are the things upon which our customers know they can count.

Money does not usually buy friendship either, but it is a well known fact that whenever a man trades his long green lettuce for that ***Lufkin Gear***, a long and friendly relationship usually results. Fair dealing and square dealing are traditional.

Here are just a few of the folks we've been dealing with for years:

**Terry Steam Turbines**
**Standard Oil Co.**
**Southland Paper Mills**
**Kirkhill Rubber Co.**
**Mathieson Chemical Co.**
**Great Lakes Pipeline**
**Santa Fe Railway**

They enjoy it, we enjoy it and you will too. So why not let ***Lufkin*** look over your gear requirements—write today!

Vic Fawcett

50th ANNIVERSARY 1902 ★ 1952

PACIFIC COAST DIVISION
5959 S. Alameda St.
Los Angeles 1, Calif.

AGENCY—
ADAM HILL CO.
244 - 9th Street
San Francisco, Calif.

DALLAS LUFKIN, TEXAS NEW YORK


# Western TRADE WINDS

## News about those who distribute and sell industrial equipment and materials

*Coaxial Connector Co.*, Mt. Vernon, N. Y., maker of UG connectors, plugs and coaxial connectors, appoints the *J. T. Hill Sales Co.*, Los Angeles, as its factory representative.

*Servel Inc.* selects *Standard Sheet Metal Works* of Phoenix as new distributor for its air conditioning products in northern Arizona. PETER HENSHEID and FLOYD COLLINS are co-owners of Standard Sheet Metal Works with main offices at 512 East Jefferson St.

*Fibreboard Products, Inc.*, appoints M. M. NEAL as sales manager of the newly established Intermountain district sales division with headquarters at Salt Lake City. He was previously Fibreboard's sales representative in that area.

*M. M. Neal*

*C. B. Gentle*

*Ira G. Perin Co.*, material handling equipment firm, San Francisco and Los Angeles, appoints CLYDE B. GENTLE to its sales engineering staff in San Francisco. He will service firm's East Bay accounts.

JOHN B. JOBE is appointed assistant district manager of *Johns-Manville* industrial products division at Los Angeles.

Manufacturing and selling rights of Heco "Flex-Tip" air blow gun is acquired by *C. A. Norgren Co.* from *Heckethorn Mfg. and Supply Co.* of Littleton, Colo.

*Hewitt-Robbins, Inc.*, establishes new Los Angeles headquarters at 2533 Malt Ave., with 13,000 sq. ft. floor space. Firm is country's largest producer of rubber products outside the tire field, and a major manufacturer of conveyor equipment. Foam rubber products will not be stocked in Los Angeles. G. V. MIGULA is Western division manager.

J. W. WOODWARD resigns as a research engineer with *North American Aviation* to become West Coast representative for industrial and government divisions of *R. M. Hollingshead Corp.*, maintenance chemical firm. He replaces J. W. REED, JR., who has been reassigned to Camden, New Jersey headquarters and promoted to position of assistant manager of government sales division.

*Hewitt-Robins Inc.*, manufacturer of industrial rubber products, foam rubber products and conveyor equipment, opens a Western division headquarters in Los Angeles. New location is at 2533 Malt Ave., part of a new industrial tract recently opened by the Santa Fe Railway Co.

*Arco Co. of California, Ltd.*, subsidiary of *American-Marietta Co.*, opens its new sales territory in San Francisco Bay Area. Headquarters are at 546 Bryant St., San Francisco. Headed by JOHN H. COLLINS, branch will make available Arco production finishes and technical service.

WILLIAM G. BALLANTYNE of *W. G. Ballantyne Co.*, Portland, Ore., is named Pacific Coast representative for Mac-it distributors in Oregon, Washington and Idaho.

*Osgood Co.* and *The General Excavator Co.*, Marion Ohio, open their new West Coast sales and service branch at 326 Shaw Road, South San Francisco, Calif.

LAWRENCE W. MATTSON joins *American Machine & Foundry Co.* as West Coast district manager of its pinspotters division.

*Lufkin Foundry & Machine Co.* expands its West Coast warehouse and service departments located at 5959 S. Alameda St., Los Angeles.

. . . continued on page 106


## The Seal of Acceptance For 50 Years

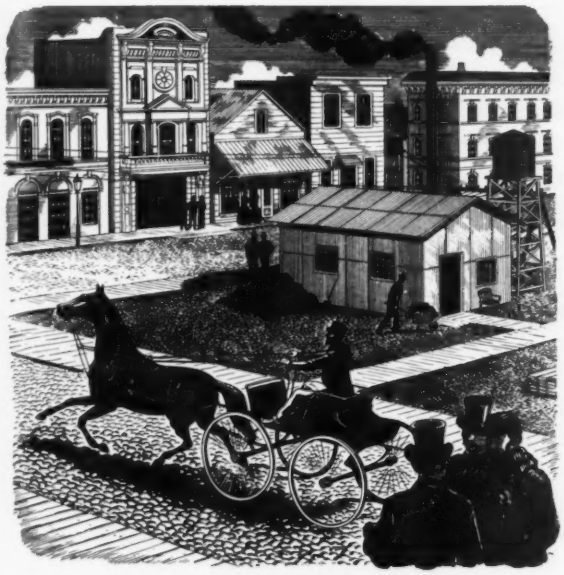
During the past 50 years General Appraisal Company has been steadily growing. Today we are the largest Western appraisal firm and one of the top ranking organizations in our field in the nation. Our company is accepted as a recognized authority. Qualified appraisers make sure that each General Appraisal is a factual property record. We invite you to discuss your next appraisal requirements with the office nearest you.

GENERAL APPRAISAL COMPANY

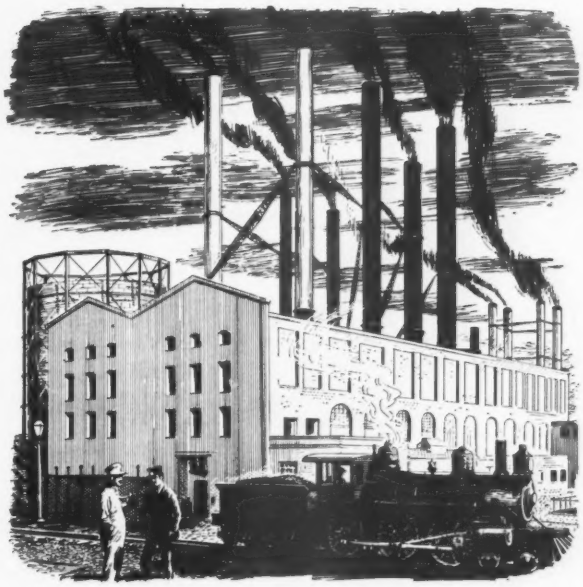
SEATTLE LOS ANGELES
PORTLAND SALT LAKE CITY
SAN FRANCISCO VANCOUVER, B. C.

# 100 YEARS EXPERIENCE

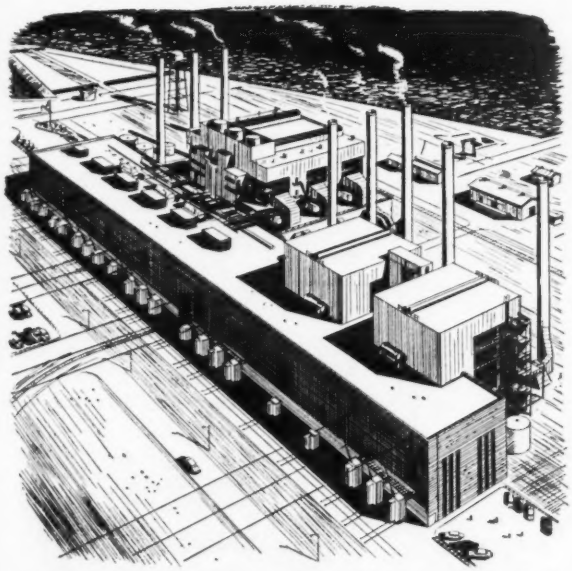
## How it's helped us develop new ways to bring you more electricity



**1879**—*San Francisco was first city in the world where anyone could buy electricity. P. G. and E. power business dates from this tiny plant.*



**1901**—*First to make electricity by burning oil instead of coal was station "A"—650 times larger than the first P. G. and E. plant.*



**1952**—*Four times more electricity per barrel of oil—compared with the 1901 plant—comes from generators in the Contra Costa plant.*

Electric service for the public didn't come to the West until 27 years after P. G. and E. began as a gas company. But when it came, it was the first anywhere in the world. In the years since, scores of power plants have been built... some using water to turn generators, some steam. Each plant has been a more efficient power producer.

Still greater progress lies ahead. With the authorization of the Atomic Energy Commission, P. G. and E. is studying generation of electricity by atomic energy.

One result of P. G. and E.'s progress is that good gas and electric service is truly cheap in California.

*Our Centennial Year*

1852 1952

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

10X-52

YOU'LL DO IT BETTER WITH

Ledeen

CYLINDERS

WHEREVER YOU HAVE TO...

PUSH or PULL

LIFT or LOWER

PRESS or SQUEEZE

TILT or TURN

OPEN or CLOSE

Ledeen cylinders used for air, oil, water, gas or steam operation with medium, heavy or super-duty models, provide a large number of variations and adaptations to meet your specific power or motion requirements. They are available in many diameters and stroke lengths with suitable head and rod attachments to provide almost any desired mounting.
Standard Ledeen cylinders and mountings from distributors' stocks in major cities. Special cylinders if required.
All J.I.C.

WRITE FOR BULLETIN 500

VALVES • CYLINDERS
AIR-HYDRAULIC PUMPS & BOOSTERS
VALVE ACTUATORS • AIR HOISTS

Ledeen Mfg. Co.
1600 So. San Pedro
Los Angeles 15, Calif.

Continued from page 104

*Palmer Manufacturing Corp.*, Phoenix, Arizona manufacturer of evaporative air coolers and gas heating equipment, makes two appointments: JACK CANADY, formerly

*J. Canady* *G. W. Benson*

sales promotion manager, is promoted to sales manager; GEORGE W. BENSON is made assistant advertising manager.

*Stromberg Time Corp.*, subsidiary of *General Time Corp.*, 109 Lafayette St., New York City, takes on sales and distribution of Cannon Signal Equipment for hospitals, institutions and commercial applications.

W. STEVEN RICH is named manager in Southwestern states for *Hunter Douglas Corp.*, producer of narrow strip aluminum.

*B. F. Goodrich Co.'s* new distribution center at 1 Hanford St., Seattle, is slated for occupancy early in 1953. This 35,000 sq. ft. building will consolidate offices and warehousing of four company divisions. B. F. Goodrich and Hood footwear divisions are now located at 566 First Ave. S. Replacement tire, industrial products, automotive and aviation and government divisions will move from 1220 First Ave. S. The B. F. Goodrich tire recap plant at 535 First Ave. S. will also move to new location.

JOHN R. BROUGHAN transfers to San Francisco from Los Angeles office of *Osborn Manufacturing Co.*, as resident sales engineer. He will headquarter at 666 Mission St., San Francisco 5, and will serve Northern California territory including Stockton and Sacramento areas.

*Electrolizing Sales and Tools, Inc.*, is set up to handle marketing and sales for *The Electrolizing Co.*, formerly an individual proprietorship owned by DAVID B. GRANT, which has recently been incorporated. New firm will also handle marketing and sale of Electrolized taps, drills, reamers, end mills, and cut-off blades; marketing and sale of *Empire Tool Co.'s* cutting-off tools, its floating tap and reamer holders.

## Steel Warehouse Functions Explained

The story of what the steel warehouse function means to industry was well set forth in two Pacific Coast meetings of the American Steel Warehouse Association in September, in two press tours in San Francisco and Los Angeles.

In Southern California, the A. M. Castle and Baker Steel and Tube plants were visited, with luncheon at the Jonathan Club following. The Northern California chapters of the Association put on a tour to the establishments of Tayler & Spotswood Co. in San Francisco and Joseph T. Ryerson & Son, Inc. in Emeryville, followed by a luncheon at the Family Club in San Francisco.

Warehouse facilities were inspected in each case, also the equipment which these distributors have for sawing, slitting, shearing and flame-cutting steel. Jack Doxsey, assistant to the president of the national association, came out from Cleveland to attend the meetings.

## What's Your Problem?

Whatever it is, don't you blow a gasket worrying about it. Fact is, we worry as much about your problems as we do about our own . . . when we know what's bothering you, and if your problem has to do with

| | |
|---|---|
| Style items | Filtering |
| Gaskets | Oil Seals |
| Vibration Mounts | Wicks |

that use felt in their manufacture. Although we are in the felt supply business, we don't stop there. We have plenty of know-how, backed by excellent Engineering and Research at the plants to solve your problems. And we have the stocks —all the felt you'll need— right here on the Pacific Coast, to satisfy your requirements, also cutting shops at San Francisco and Los Angeles to cut felt to any specification required.

Let's get together.

**American Felt Company**
TRADE MARK

GENERAL OFFICES: GLENVILLE, CONN.
PACIFIC COAST: A. B. BOYD COMPANY
Los Angeles PR 6121
San Francisco UN. 1-3877
Portland VE 6649
Seattle MA. 6545
San Diego FR 0992


# CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.


**ROSS FORK LIFT**
7 Ton, 16 Ft. Completely Rebuilt. New Tires. Completely Majored Continental Engine, New Hydraulic lines, etc. As near new as possible to make it. $4975. Will accept car, airplane or truck as part payment.
**Ed Boeve, Inc.**
4636 S.E. 82nd, Portland, Ore., Phone SU 0200

**NAME PLATES**
ETCHING COMPANY OF AMERICA
55 New Montgomery Street
DOuglas 2-8434 San Francisco, Calif.


### Safety cited

SHELL Development Co., Emeryville, Calif., receives the American Petroleum Institute's Accident Prevention Award for establishing a new high of 2,102,120 man-hours worked without a disabling injury. A second certificate is awarded to the Company's research division with a record of 1,439,400 accident-free hours.


**AIR COMPRESSORS**

1—I-R cross compound unit with three-step unloading, disc valves, 535 cfm displacement (100 HP required)—beautiful condition.

1—Gardner-Denver radial type with tube-type intercooler, 445 cfm displacement, 75 HP electric motor, base, V-drive—fully reconditioned.

1—Davey two-cylinder air-cooled 105 cfm delivery with direct connected 25 HP electric motor—fully reconditioned.

1—Chicago-Pneumatic two-cylinder air-cooled tank mounted unit with or without 15 HP electric motor and V-drive—fully reconditioned.

*Motors, Pumps, Supplies*

**MILLER MACHINERY CO.**
BOX 1496, MISSOULA, MONT.

**ABRASIVES WANTED**
Rolls, Sheets, Wet-or-Dry Belts, Rotary Files, Grinding Wheels, etc.
Cash in on your surplus. Write:
**K & K SALES**
525 W. 76th Street Chicago 20, Illinois
Phone: RAdcliffe 3-1818

*Mere payment of premiums does not insure*

● It is easy to buy fire insurance but difficult to prove a loss.

When fire occurs *you* must be able to prove what you lost and its cash value.

With Continuous American Appraisal Service, you will always be prepared.

*The* AMERICAN APPRAISAL *Company*

*Over Fifty Years of Service*
OFFICES IN PRINCIPAL CITIES

**100 GENUINE 8 x 10 PHOTOS 10¢ ea**
**24 HOUR SERVICE!**
*FREE DELIVERY ANYWHERE*
MADE DIRECT FROM PHOTOS (OR NEGATIVES)
50 8 x 10 13c ea.
500 8 x 10 8c ea.
**1000 8 x 10 GLOSSIES 7¢ EACH**
**POSTCARDS**
**5000 $21 PER M. 2½¢ each 1000 lots**
*SAVE THROUGH QUANTITY PRODUCTION*
FOR COMPLETE PRICE INFORMATION WRITE OR PHONE:
GRanite 6179
**QUANTITY PHOTOS, Inc.**
5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.
LARGEST PHOTO REPRODUCTION PLANT IN WEST

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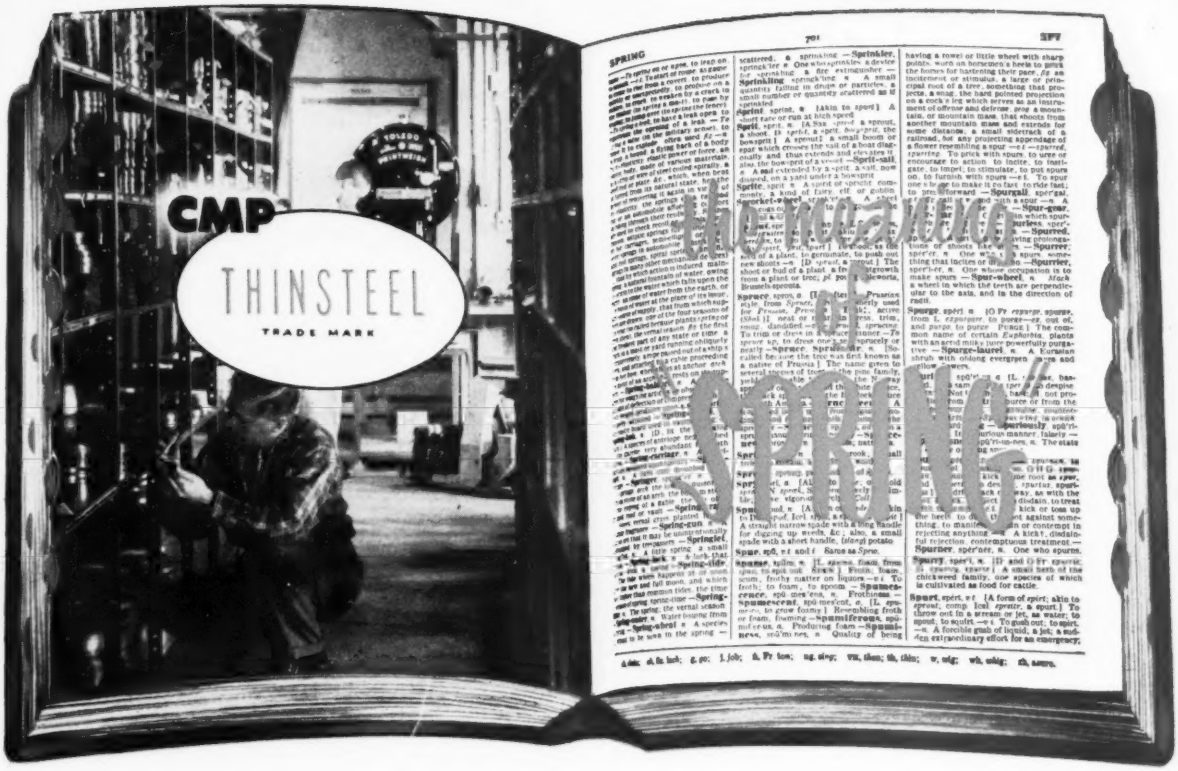
Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO.
1845 E. 57th St., Los Angeles 58




The word "spring"
has many varied meanings. The
dictionary defines spring, among other things, as
"a season of the year"; "to move suddenly or quickly";
or "a source of water"—hence any source of continued supply.
These definitions can be as accurately applied to the purpose and
function of our Los Angeles steel warehouse. Our inventory of flat rolled
spring steel, annealed, or tempered polished and colored, offers the widest
selection of grades and sizes available in this area all during the year. We are
equipped and staffed to move this spring steel out of our inventory into your
production line as quickly as you have need and our policy of maintaining
adequate stock levels insures availability of a continuing supply at all times.
This similarity of definition is more than coincidence. When one wants
to know the meaning of a word, the dictionary is the undisputed
source of knowledge. With equal reliance, we believe you
can refer your spring steel questions to us. We
have the answer — or we know
where we can get it.

**HERE'S FAST WAREHOUSE SERVICE**

Low carbon cold rolled strip • Cold rolled electro zinc coated strip • Cold rolled shim steel • High carbon annealed spring steel • Hardened and tempered spring steel • Cold rolled annealed stainless strip • Cold rolled hi-tensile stainless strip • Hot dipped galvanized sheets • Coils—cut lengths • Custom slitting service for your metals

**Telephone PLeasant 3-1291**

**the Cold Metal Products co. of California**

6600 McKINLEY AVENUE • LOS ANGELES

POSTMASTER:
"Form 3547 Requested"
WESTERN INDUSTRY
609 Mission Street
San Francisco 5, Calif.

Acceptance under
Section 34.64 P. L. & R.
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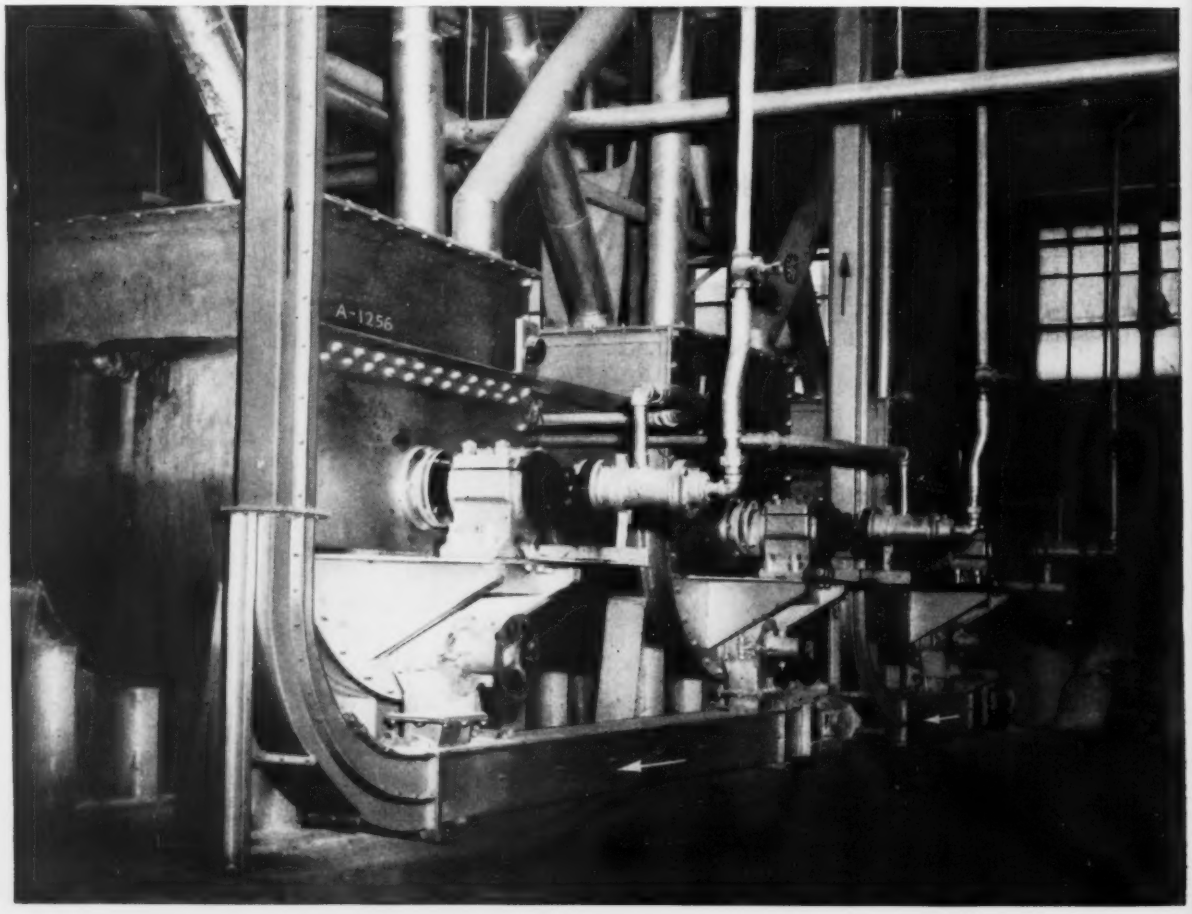
# Maintaining a 10-Year Flow

## OF STARCH AND DEXTRINE

**REDLER** conveyors and elevators, some of them 10 years old, are used at this plant to handle bulk starch and dextrine. Sealed dust-tight REDLER casings insure purity of product and prevent loss by spillage. Compact REDLER casing requires minimum space, and flexible conveyor-elevator arrangements permit a handling system that will meet any plant's specific needs.

The success of REDLERS at this plant is evidenced by the increasing number of units being put into service.

A REDLER bulk handling system may be the ideal, low-cost-per-ton answer to your plant's handling problems. Whether you plan an entirely new or a revised plant layout, check on the REDLER advantages. Ask for an S-A engineer's recommendation...there's no obligation, so do it today.

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1007 E. Burnside St., Portland 14, Ore.

STEPHEN S-A ADAMSON MFG. CO.
2227 E. 37th STREET, LOS ANGELES 58, CALIF.

Washington Machinery & Storage Co.
7329 E. Marginal Way, Seattle 8, Wash.

*Bulk Material Handling Equipment*